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Hatano et al.

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(45) **Date of Patent: May 24, 2011**

(54) **DRIVER MANAGEMENT METHOD, DRIVER MANAGEMENT APPARATUS, AND DRIVER MANAGEMENT PROGRAM**

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(73) Assignee: **Fuji Xerox Co., Ltd.**, Tokyo (JP)

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(30) **Foreign Application Priority Data**

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Feb. 13, 2004 (JP) 2004-036666

(51) **Int. Cl.**
G06F 15/177 (2006.01)

(52) **U.S. Cl.** **709/220**; 709/249; 709/219; 709/223; 709/230; 709/218; 358/1.13; 358/1.15; 711/118; 719/321; 235/435

(58) **Field of Classification Search** 709/220–222
See application file for complete search history.

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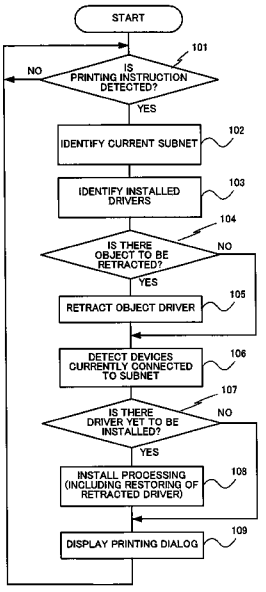
(74) *Attorney, Agent, or Firm* — Oliff & Berridge, PLC

(57) **ABSTRACT**

Driver management method, driver management apparatus and driver management program which manages drivers corresponding to devices connected to a network, in which devices connected to a subnet of the network are detected, and drivers corresponding to the devices connected to the subnet, of drivers installed in a user terminal are presented to a user.

5 Claims, 17 Drawing Sheets



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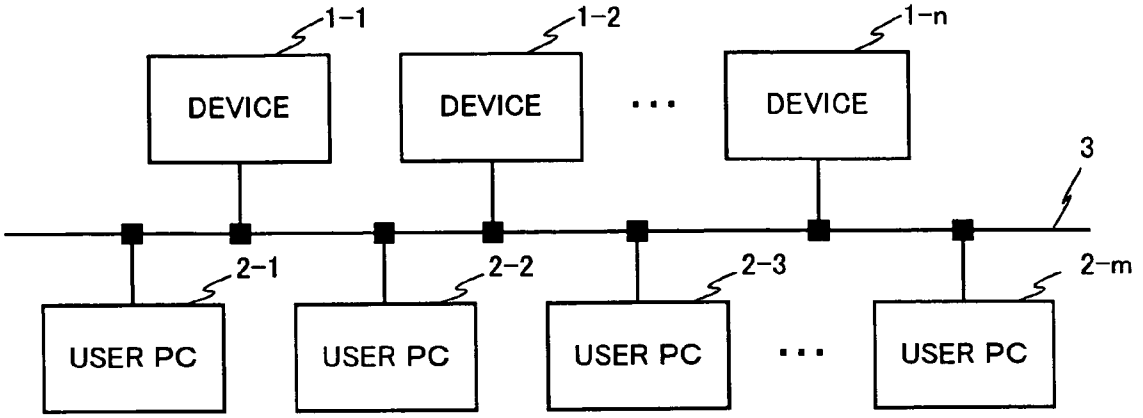
1-1
1-2
1-n
DEVICE
DEVICE
DEVICE
3
2-1
2-2
2-3
2-m
USER PC
USER PC
USER PC
USER PC

FIG. 1

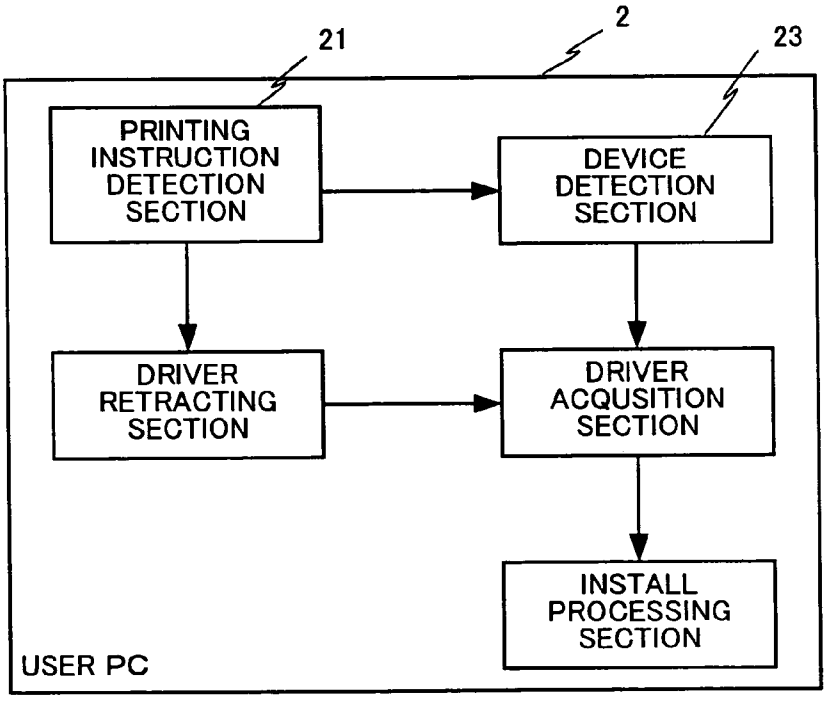
21
2
23
PRINTING INSTRUCTION DETECTION SECTION
DEVICE DETECTION SECTION
DRIVER RETRACTING SECTION
DRIVER ACQUSITION SECTION
INSTALL PROCESSING SECTION
USER PC

FIG. 2

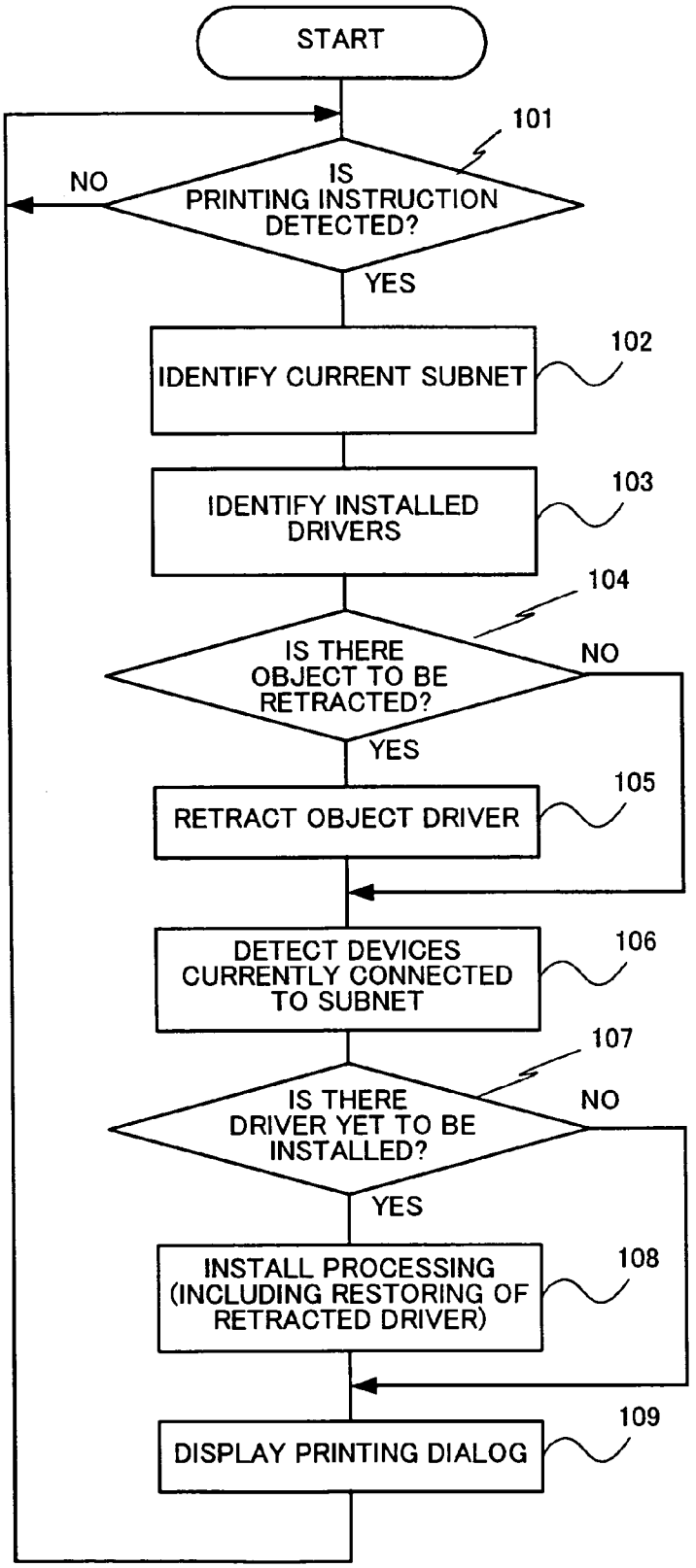
START
101
IS PRINTING INSTRUCTION DETECTED?
NO
YES
IDENTIFY CURRENT SUBNET
102
IDENTIFY INSTALLED DRIVERS
103
104
IS THERE OBJECT TO BE RETRACTED?
NO
YES
RETRACT OBJECT DRIVER
105
DETECT DEVICES CURRENTLY CONNECTED TO SUBNET
106
107
IS THERE DRIVER YET TO BE INSTALLED?
NO
YES
INSTALL PROCESSING (INCLUDING RESTORING OF RETRACTED DRIVER)
108
DISPLAY PRINTING DIALOG
109

FIG. 3

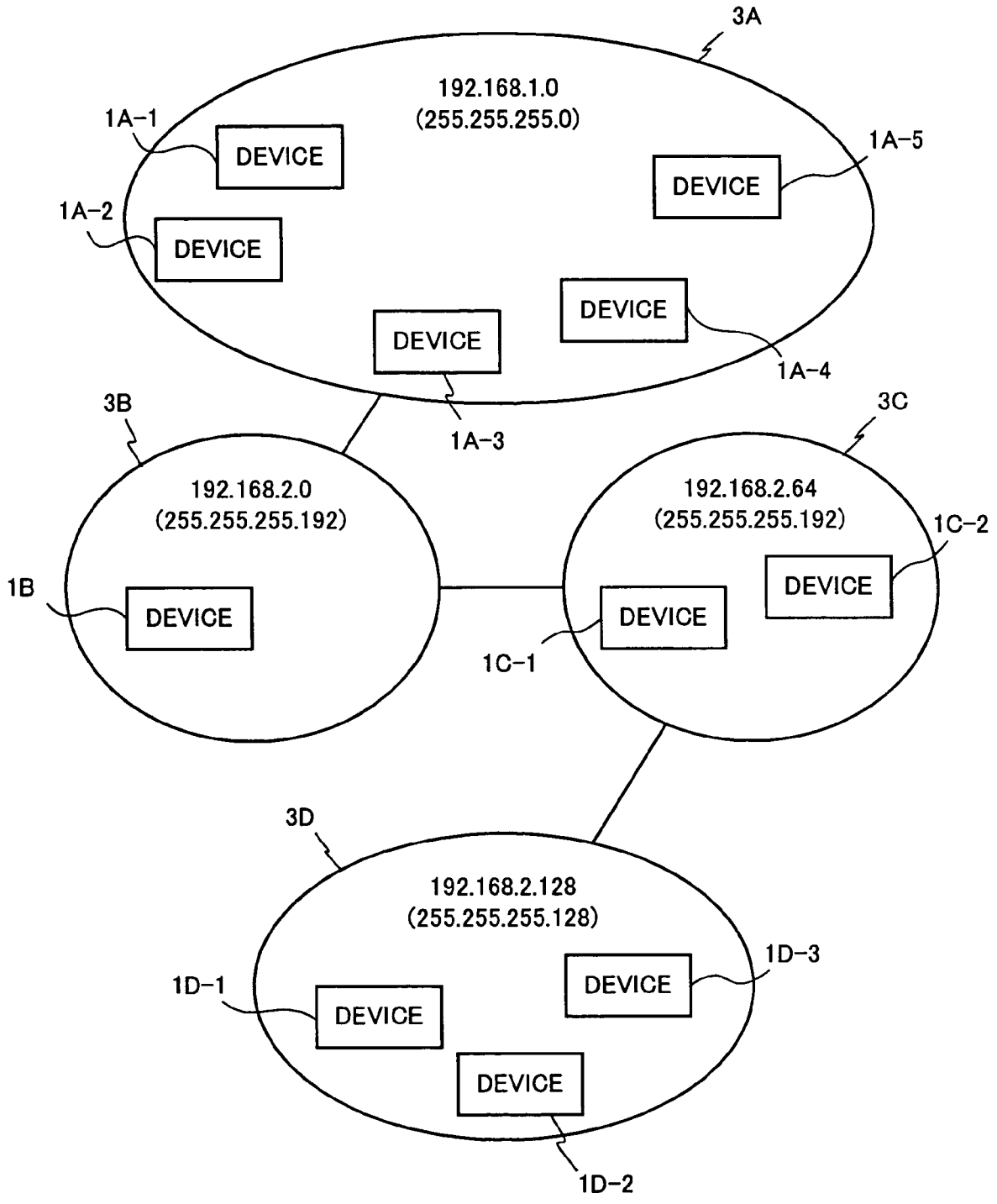
3A
192.168.1.0
(255.255.255.0)
1A-1
DEVICE
1A-5
DEVICE
1A-2
DEVICE
DEVICE
DEVICE
1A-4
1A-3
3B
192.168.2.0
(255.255.255.192)
1B
DEVICE
3C
192.168.2.64
(255.255.255.192)
1C-2
DEVICE
DEVICE
1C-1
3D
192.168.2.128
(255.255.255.128)
1D-3
DEVICE
1D-1
DEVICE
DEVICE
1D-2

FIG. 4

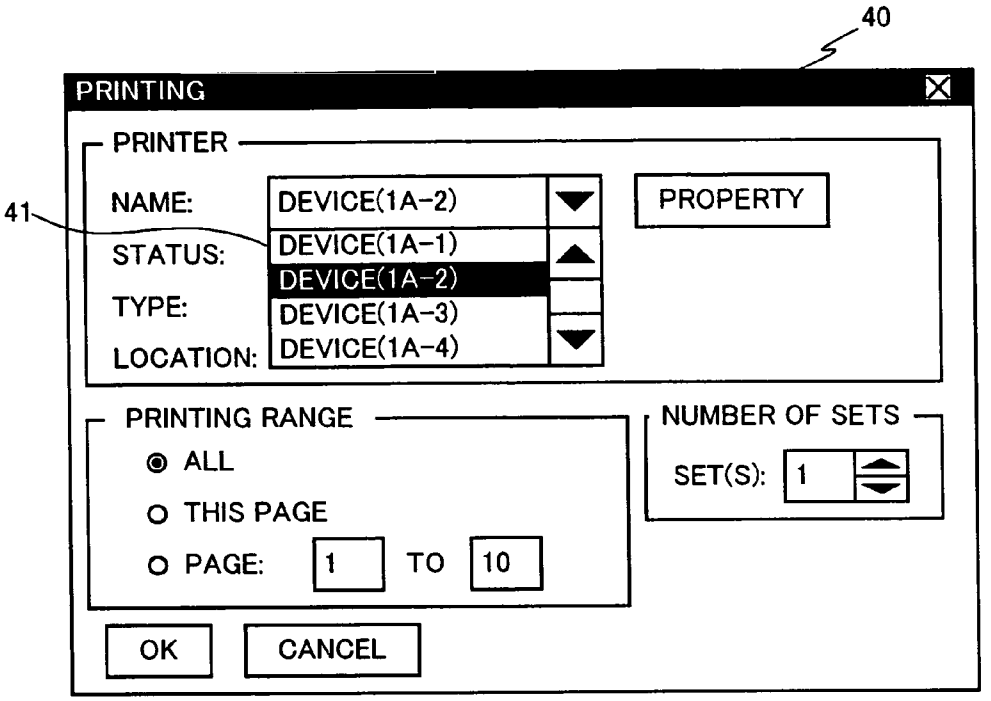
40
PRINTING
PRINTER
NAME:
DEVICE(1A-2)
PROPERTY
41
STATUS:
DEVICE(1A-1)
DEVICE(1A-2)
TYPE:
DEVICE(1A-3)
LOCATION:
DEVICE(1A-4)
PRINTING RANGE
ALL
THIS PAGE
PAGE:
1
TO
10
NUMBER OF SETS
SET(S):
1
OK
CANCEL

FIG. 5A

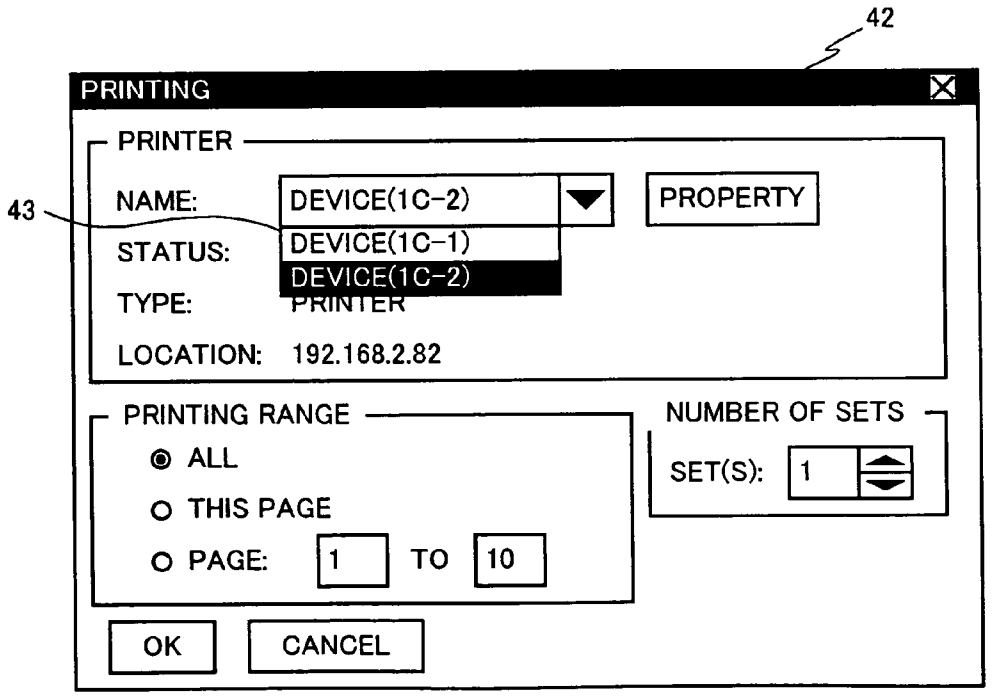
42
PRINTING
PRINTER
NAME:
DEVICE(1C-2)
PROPERTY
43
STATUS:
DEVICE(1C-1)
DEVICE(1C-2)
TYPE:
PRINTER
LOCATION:
192.168.2.82
PRINTING RANGE
ALL
THIS PAGE
PAGE:
1
TO
10
NUMBER OF SETS
SET(S):
1
OK
CANCEL

FIG. 5B

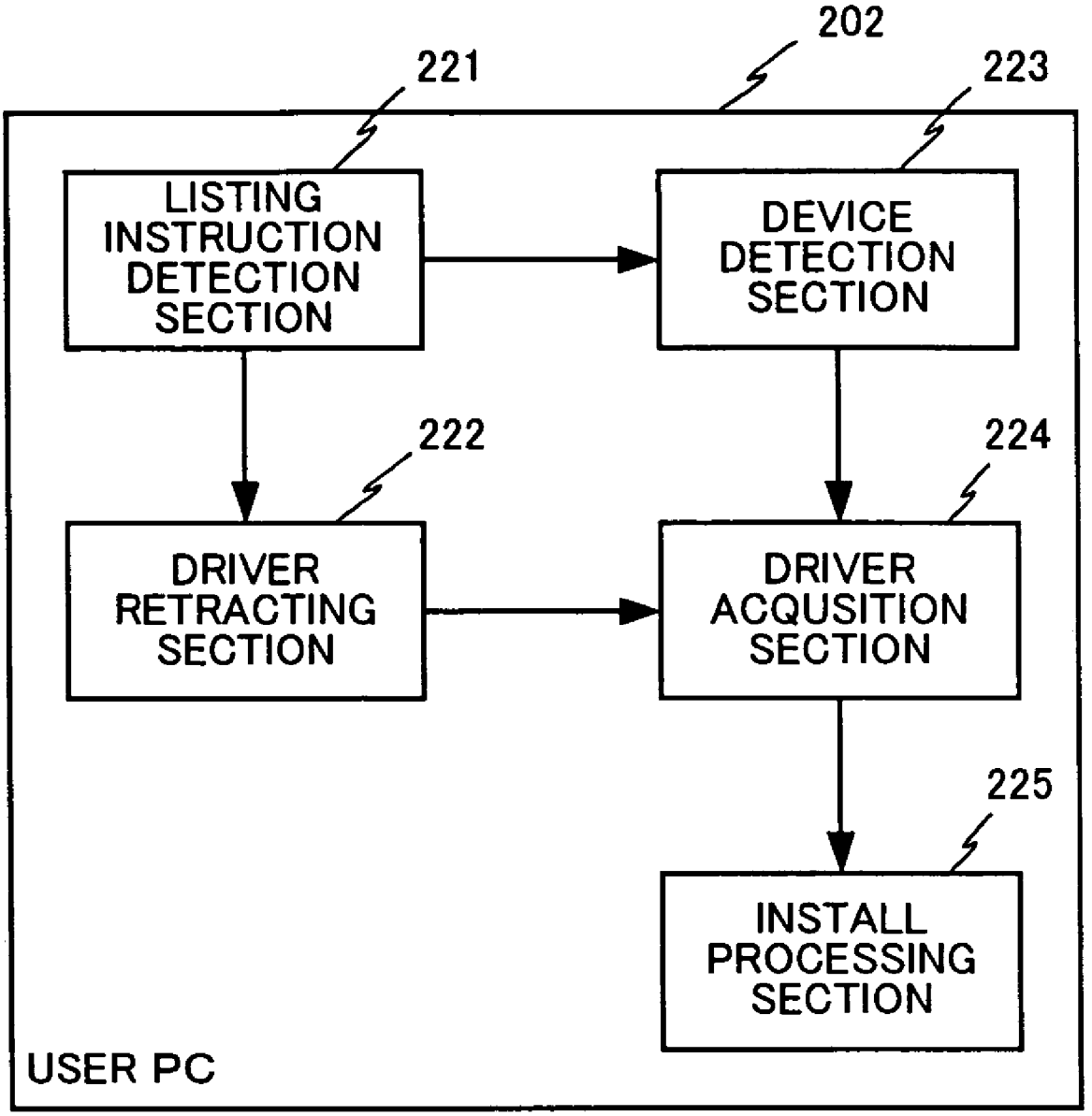
202
221
223
LISTING INSTRUCTION DETECTION SECTION
DEVICE DETECTION SECTION
222
224
DRIVER RETRACTING SECTION
DRIVER ACQUSITION SECTION
225
INSTALL PROCESSING SECTION
USER PC

FIG. 6

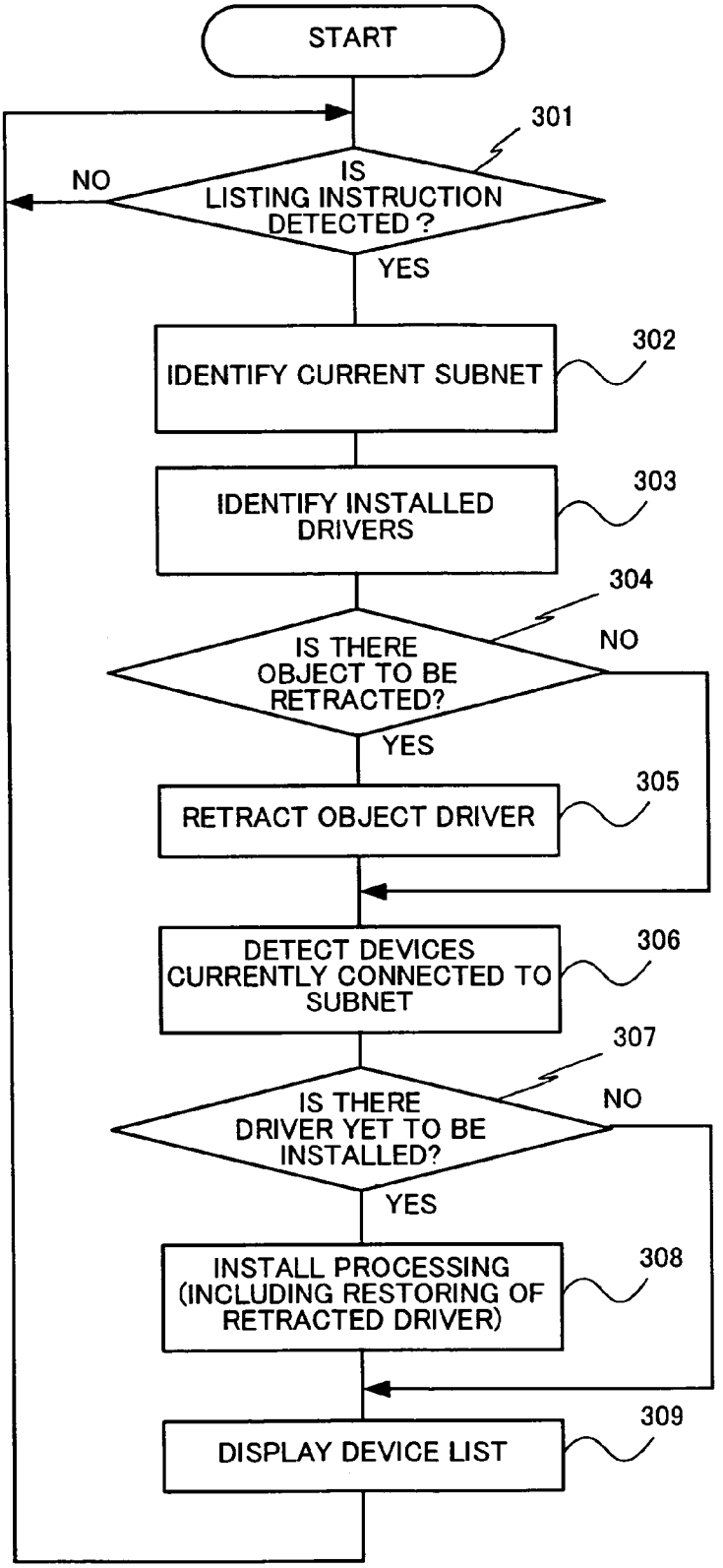
START
301
IS LISTING INSTRUCTION DETECTED ?
NO
YES
IDENTIFY CURRENT SUBNET
302
IDENTIFY INSTALLED DRIVERS
303
304
IS THERE OBJECT TO BE RETRACTED?
NO
YES
RETRACT OBJECT DRIVER
305
DETECT DEVICES CURRENTLY CONNECTED TO SUBNET
306
307
IS THERE DRIVER YET TO BE INSTALLED?
NO
YES
INSTALL PROCESSING (INCLUDING RESTORING OF RETRACTED DRIVER)
308
DISPLAY DEVICE LIST
309

FIG. 7

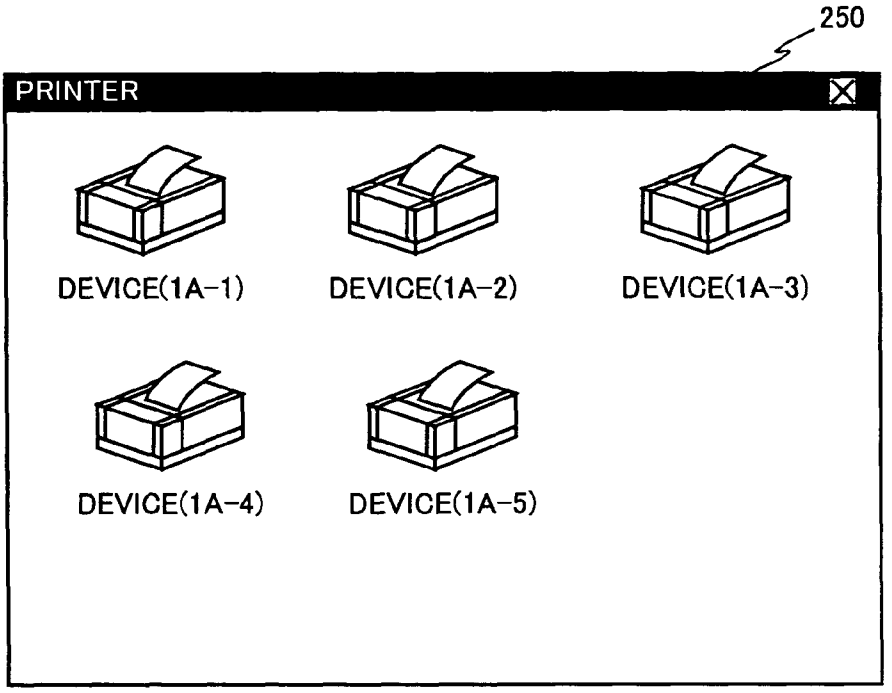
250
PRINTER
DEVICE(1A-1)
DEVICE(1A-2)
DEVICE(1A-3)
DEVICE(1A-4)
DEVICE(1A-5)

FIG. 8A

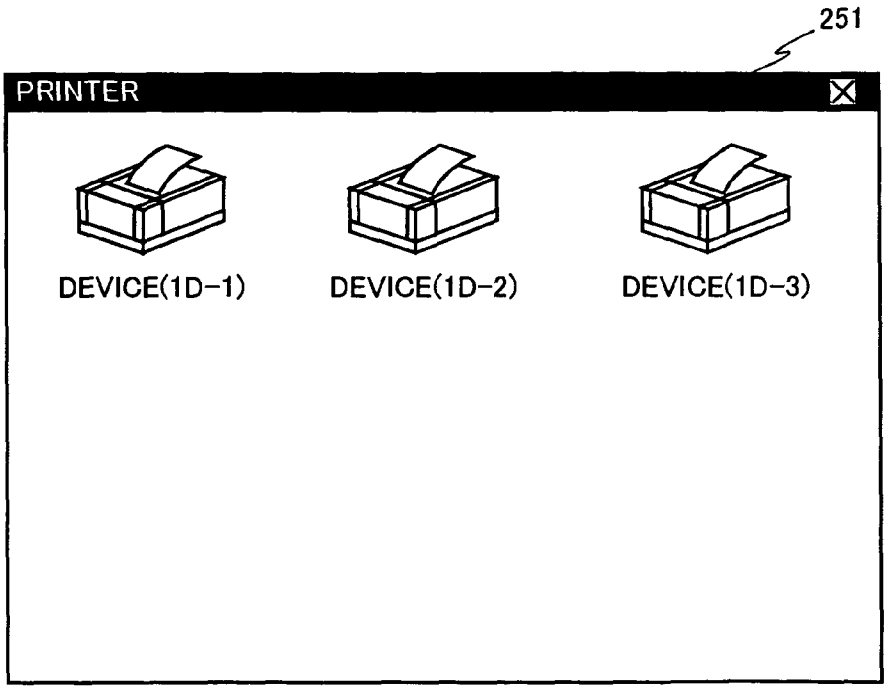
251
PRINTER
DEVICE(1D-1)
DEVICE(1D-2)
DEVICE(1D-3)

FIG. 8B

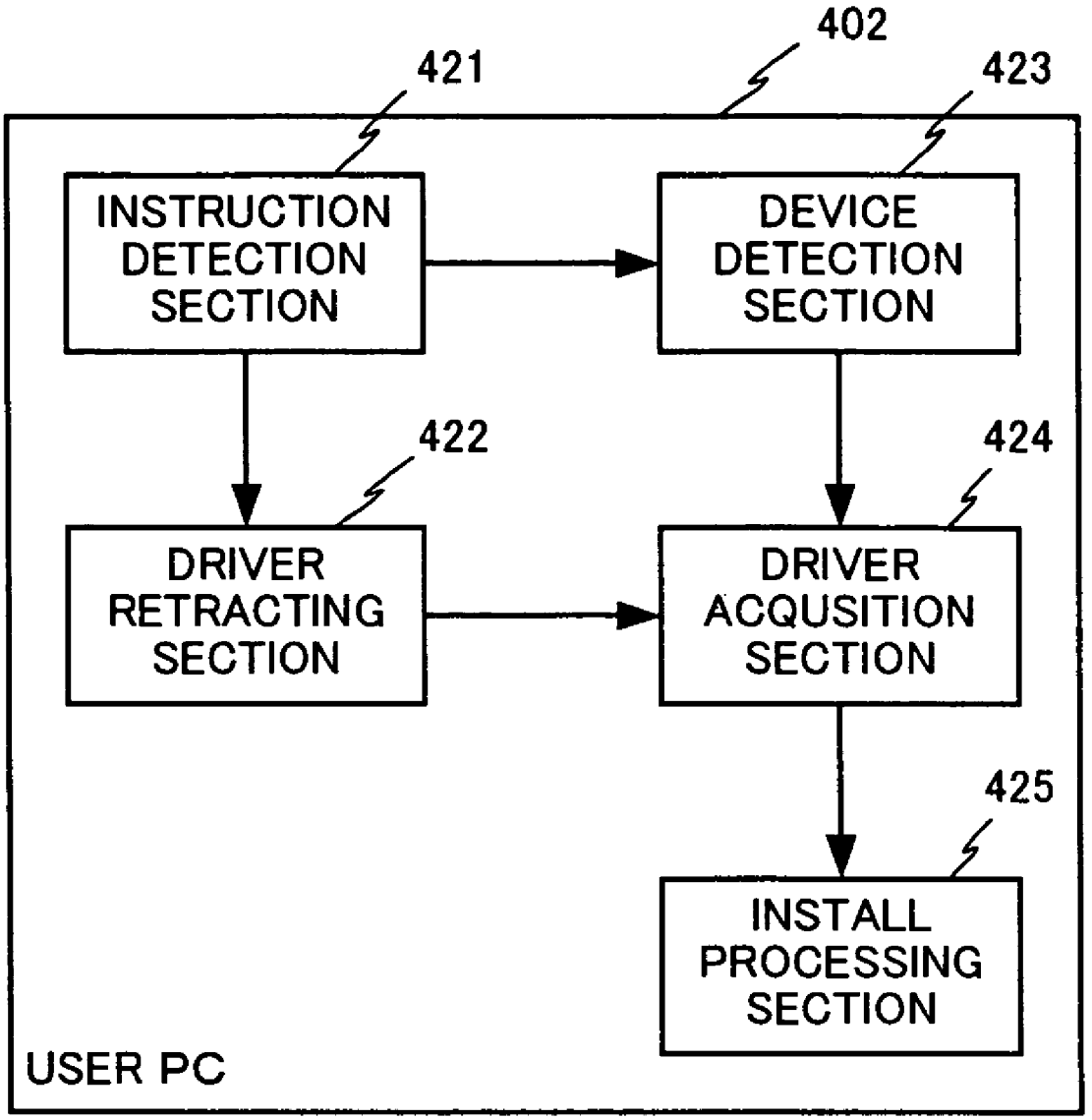
402
421
423
INSTRUCTION DETECTION SECTION
DEVICE DETECTION SECTION
422
424
DRIVER RETRACTING SECTION
DRIVER ACQUSITION SECTION
425
INSTALL PROCESSING SECTION
USER PC

FIG. 9

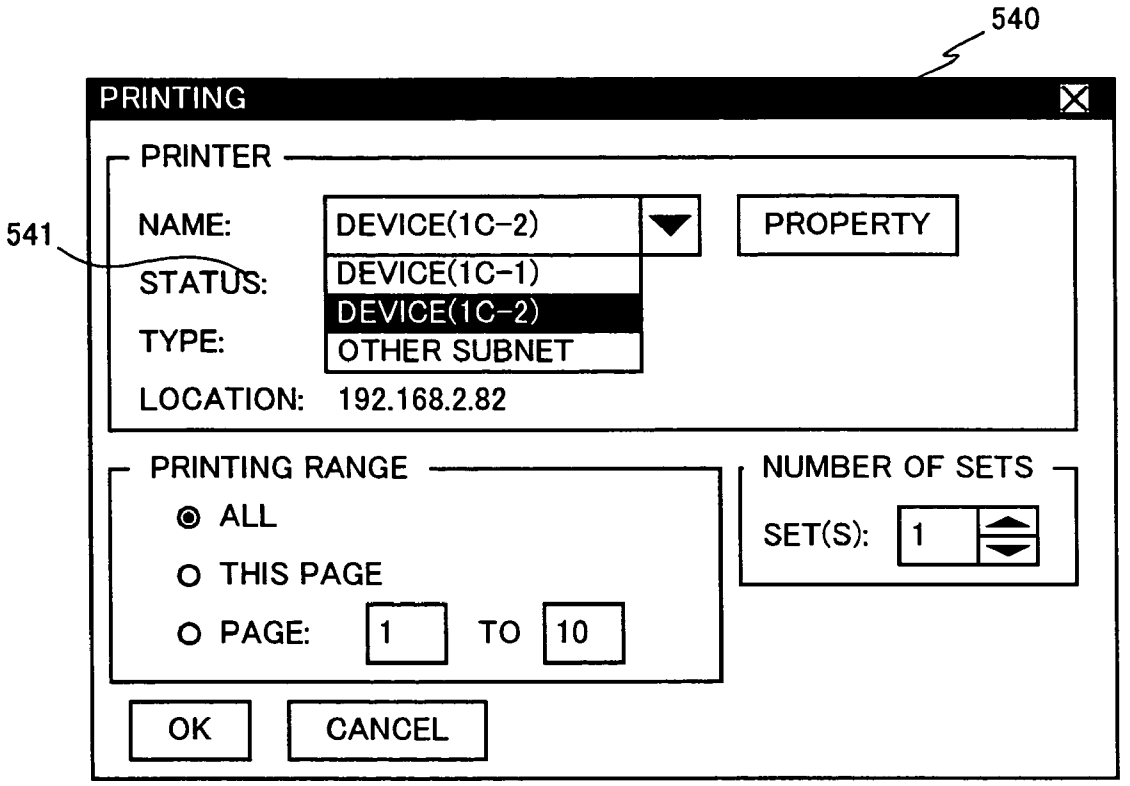

FIG. 10A

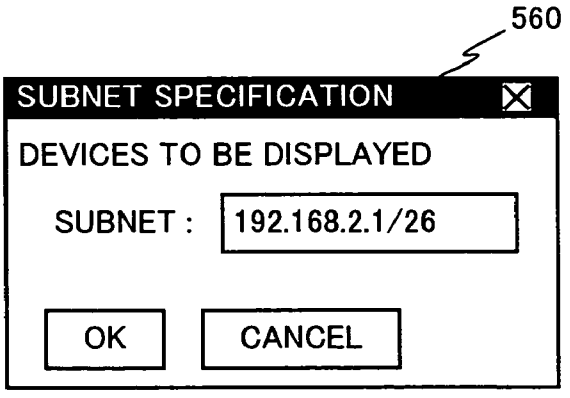

FIG. 10B

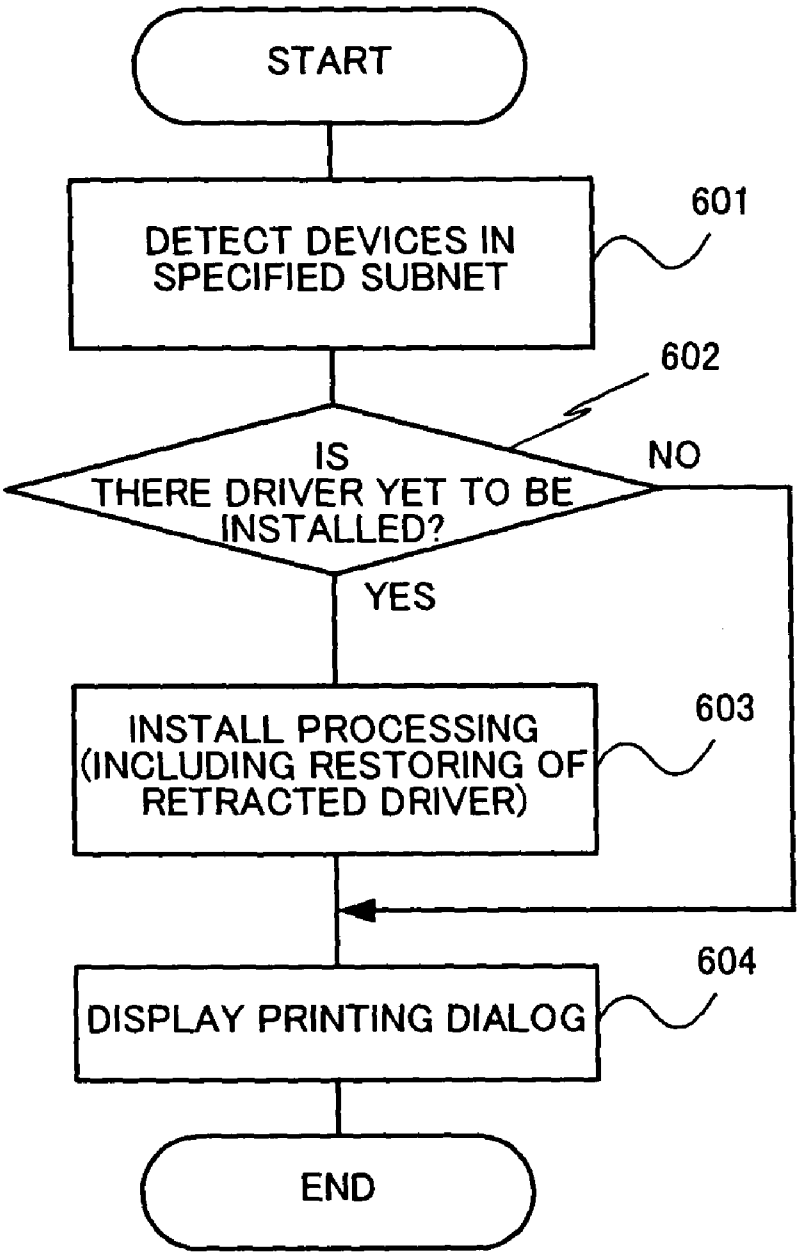
START
DETECT DEVICES IN SPECIFIED SUBNET
601
602
IS THERE DRIVER YET TO BE INSTALLED?
NO
YES
INSTALL PROCESSING (INCLUDING RESTORING OF RETRACTED DRIVER)
603
DISPLAY PRINTING DIALOG
604
END

FIG. 11

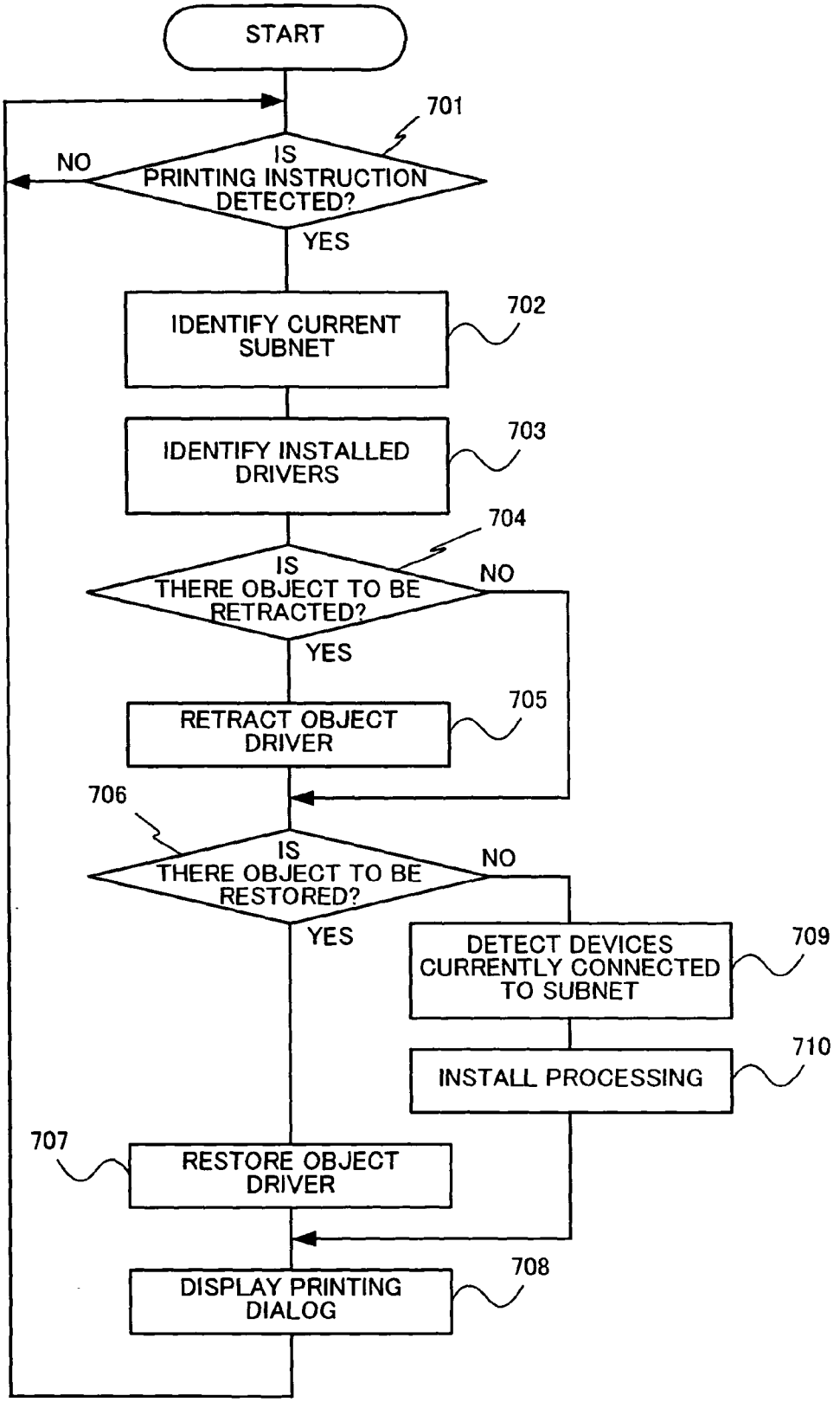
START
701
IS PRINTING INSTRUCTION DETECTED?
NO
YES
IDENTIFY CURRENT SUBNET
702
IDENTIFY INSTALLED DRIVERS
703
704
IS THERE OBJECT TO BE RETRACTED?
NO
YES
RETRACT OBJECT DRIVER
705
706
IS THERE OBJECT TO BE RESTORED?
NO
YES
DETECT DEVICES CURRENTLY CONNECTED TO SUBNET
709
INSTALL PROCESSING
710
707
RESTORE OBJECT DRIVER
DISPLAY PRINTING DIALOG
708

FIG. 12

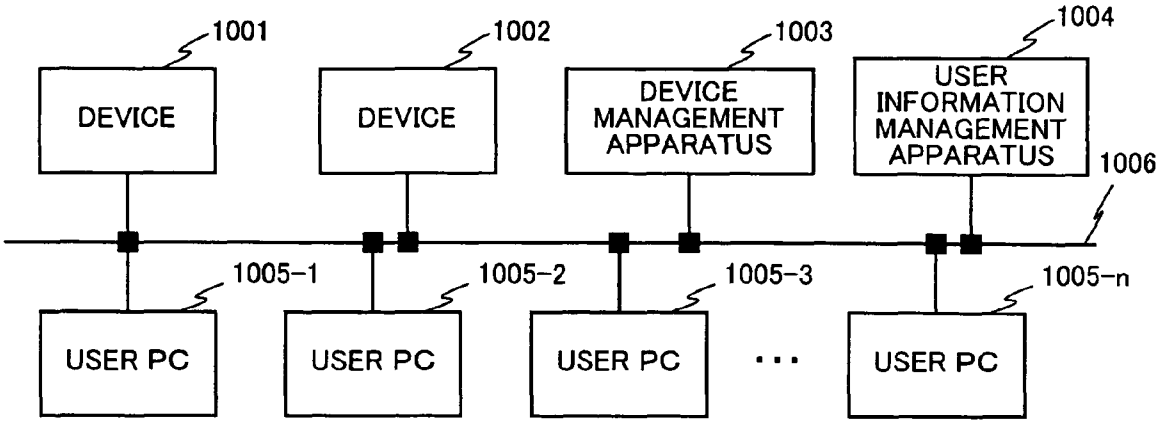
1001
DEVICE
1002
DEVICE
1003
DEVICE MANAGEMENT APPARATUS
1004
USER INFORMATION MANAGEMENT APPARATUS
1006
1005-1
USER PC
1005-2
USER PC
1005-3
USER PC
1005-n
USER PC

FIG. 13

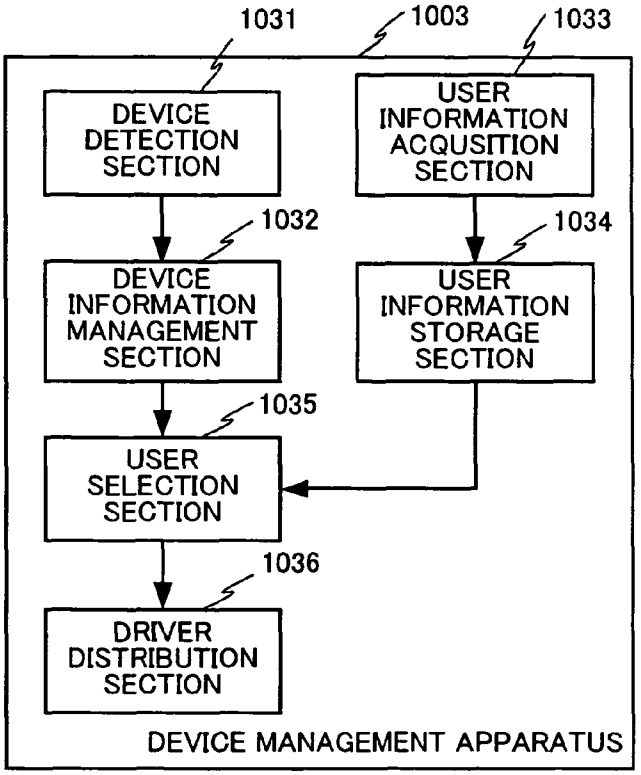
1031
1003
1033
DEVICE DETECTION SECTION
USER INFORMATION ACQUSITION SECTION
1032
1034
DEVICE INFORMATION MANAGEMENT SECTION
USER INFORMATION STORAGE SECTION
1035
USER SELECTION SECTION
1036
DRIVER DISTRIBUTION SECTION
DEVICE MANAGEMENT APPARATUS

FIG. 14

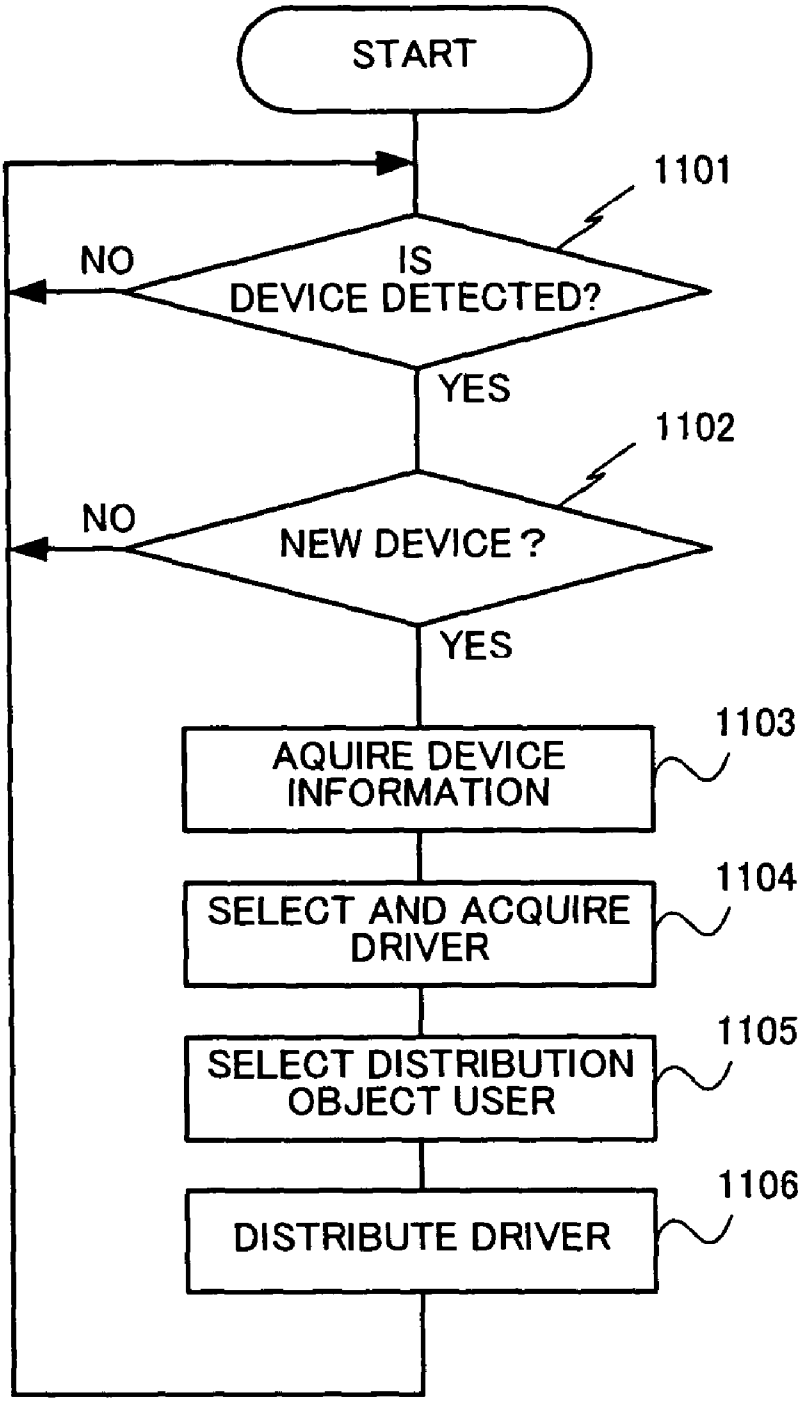
START
1101
IS DEVICE DETECTED?
NO
YES
1102
NEW DEVICE ?
NO
YES
1103
AQUIRE DEVICE INFORMATION
1104
SELECT AND ACQUIRE DRIVER
1105
SELECT DISTRIBUTION OBJECT USER
1106
DISTRIBUTE DRIVER

FIG. 15

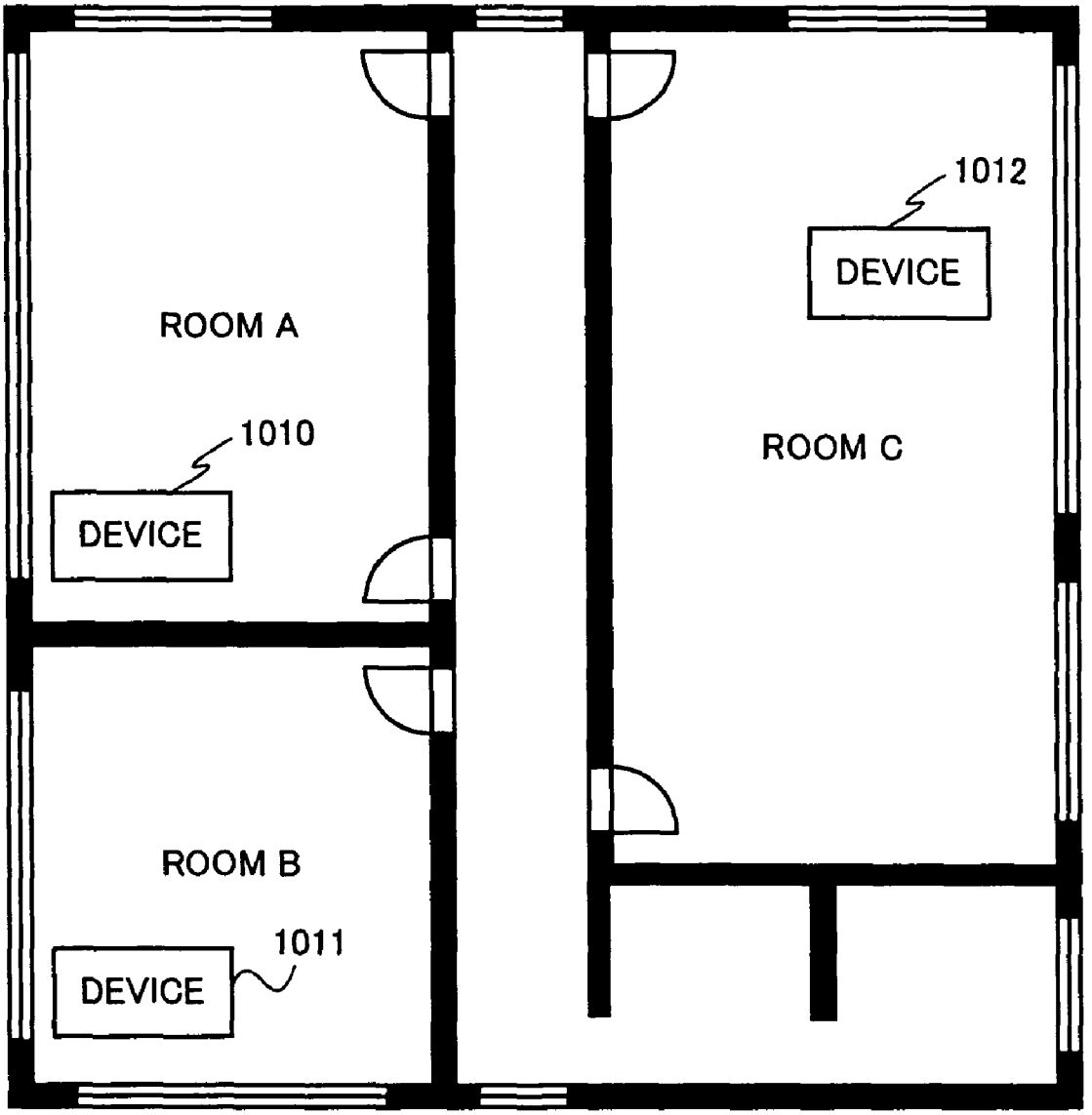

FIG. 16

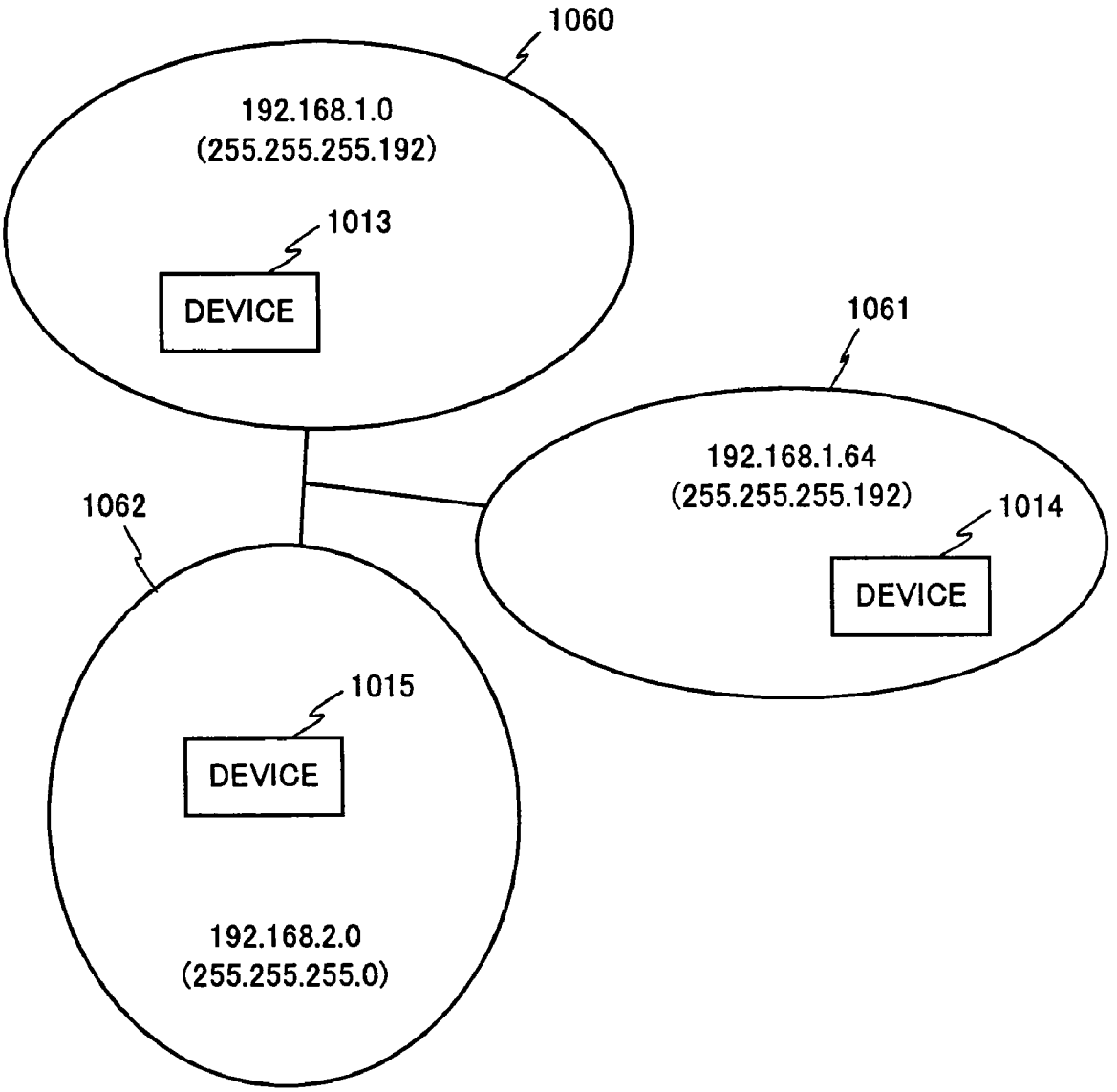
1060
192.168.1.0
(255.255.255.192)
1013
DEVICE
1061
192.168.1.64
(255.255.255.192)
1014
DEVICE
1062
1015
DEVICE
192.168.2.0
(255.255.255.0)

FIG. 17

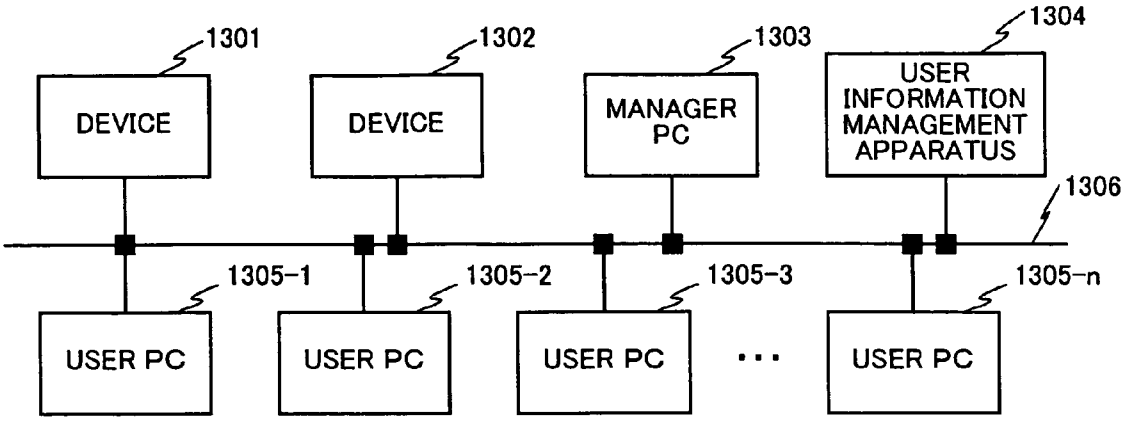
1301
DEVICE
1302
DEVICE
1303
MANAGER PC
1304
USER INFORMATION MANAGEMENT APPARATUS
1306
1305-1
USER PC
1305-2
USER PC
1305-3
USER PC
1305-n
USER PC

FIG. 18

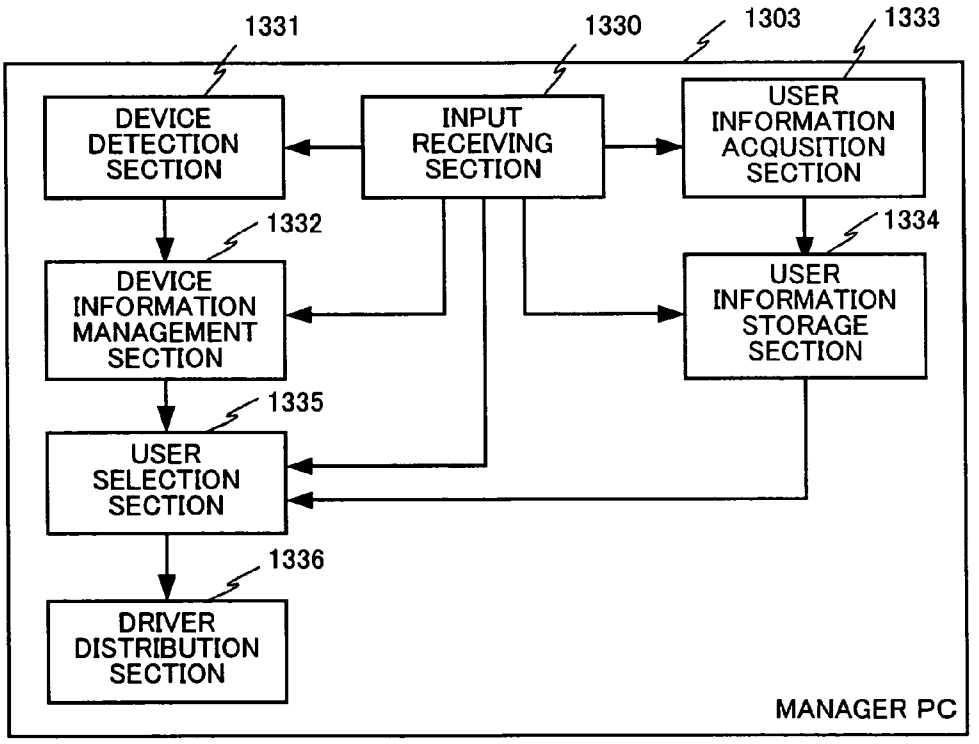
1331
DEVICE DETECTION SECTION
1330
INPUT RECEIVING SECTION
1303
1333
USER INFORMATION ACQUSITION SECTION
1332
DEVICE INFORMATION MANAGEMENT SECTION
1334
USER INFORMATION STORAGE SECTION
1335
USER SELECTION SECTION
1336
DRIVER DISTRIBUTION SECTION
MANAGER PC

FIG. 19

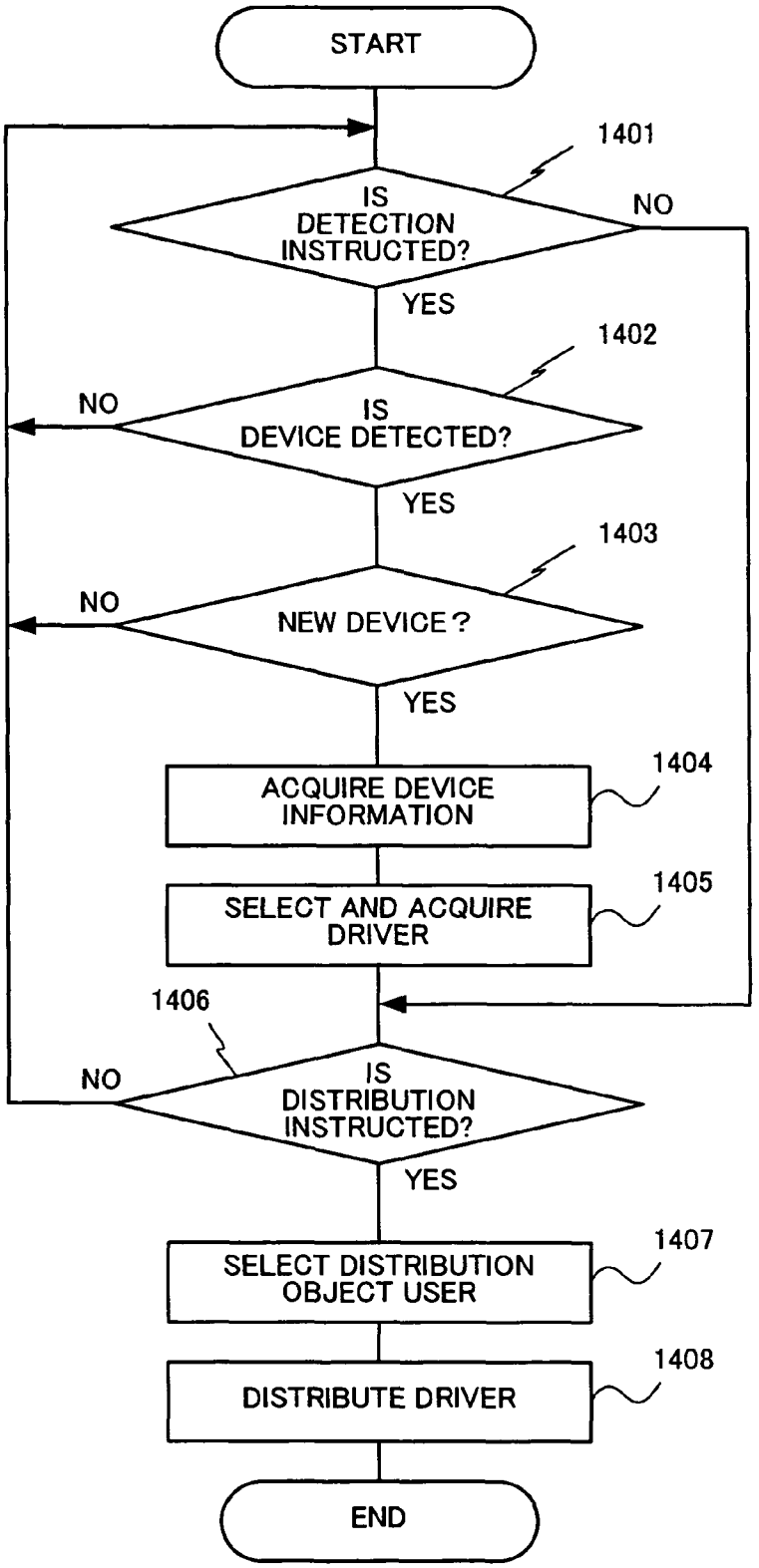
START
1401
IS DETECTION INSTRUCTED?
NO
YES
1402
IS DEVICE DETECTED?
NO
YES
1403
NEW DEVICE?
NO
YES
1404
ACQUIRE DEVICE INFORMATION
1405
SELECT AND ACQUIRE DRIVER
1406
IS DISTRIBUTION INSTRUCTED?
NO
YES
1407
SELECT DISTRIBUTION OBJECT USER
1408
DISTRIBUTE DRIVER
END

FIG. 20

DRIVER MANAGEMENT METHOD, DRIVER MANAGEMENT APPARATUS, AND DRIVER MANAGEMENT PROGRAM

The entire disclosure of Japanese patent application no. 2004-025483 filed on Feb. 2, 2004, and Japanese patent application no. 2004-036666 filed on Feb. 13, 2004 including specification, claims, drawings and abstract is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

The present invention relates to a driver management method, a driver management apparatus, and a driver management program, and particularly, to a driver management method, a driver management apparatus, and a driver management program for managing the drivers corresponding to devices connected to a network.

BACKGROUND OF THE INVENTION

In recent years, with the network communications becoming popularized, a variety of devices, such as printers, facsimiles, and scanners, have been made network compatible, and the opportunities of using these devices by a plurality of users through the network have been increasing.

When a device, such as a printer, is to be used by a personal computer (hereafter abbreviated as PC), the driver corresponding to the device to be used must be installed in the PC.

To install the driver, the device must be selected, and the driver for the selected device and the setting information, such as the address, must be acquired. This is troublesome not only for users who are not familiar with the operations of a PC, but also users who are familiar with such operations.

Therefore, some network systems are configured such that the driver distribution information is written in the domain server to be accessed at the time of logging in as a log-in script, so that the driver is installed when each PC is logged in the network. Further, there is another technology in which, when a PC enters the radio communication area for a wireless LAN (Local Area Network), the PC is allowed to communicate with the radio access point, and the driver is distributed from the access point to the PC (as disclosed in Japanese patent application publication No. 2002-259089, for example).

When a device, such as a printer, is to be used by a PC or the like, the driver corresponding to the device to be used must be installed in the PC. On such occasions, unless the user knows when such a device was installed and when it became available, the user cannot install the driver in the PC. Therefore, when the device was installed, the manager had to take a procedure to notify each user of the installation of the device and the information regarding the device.

There has been a technology for facilitating the above procedure, in which the server receives the printer identifier from a newly added network printer, generates an executable install program by using the printer identifier, and transmits the install program to the client processor. The client processor installs the executable install program (as disclosed in Japanese patent application publication No. 2000-215128, for example).

As stated above, the user must install the driver before using a printer or other device, and the processing for installing the driver is troublesome. In addition, the technology for installing the driver could demonstrate its advantageous utility only under such special conditions as that given when a radio LAN is used, or when a specific network system is employed as disclosed in Japanese patent application publication No. 2002-259089.

Further, with the technology as disclosed in Japanese patent application publication No. 2000-215128, the driver for a printer or the like is distributed also to the users who do not wish to use a device pertinent to that driver for such a reason as the installation-location of the device is remote. For such users, the distribution of the driver might have been a trouble.

SUMMARY OF THE INVENTION

The present invention has been made in view of the above circumstances and provides a driver management method, a driver management apparatus, and a driver management program for allowing any particular device connected to a network to be used without the need for the user considering the installation of the driver.

Further, the present invention has been made in view of the above circumstances, and provides a driver management method, a driver management apparatus, and a driver management program for allowing constructing a system which distributes the driver for a newly connected device only to the appropriate users without the need for the user or the manager making a troublesome operation.

In the present invention, a driver management method which manages drivers corresponding to devices connected to a network, comprises detecting devices connected to a subnet of the network; and presenting to a user drivers corresponding to the devices connected to the subnet, of drivers installed in a user terminal.

According to the present invention, the devices connected to a particular subnet of the network is detected, and the drivers corresponding to the devices connected to the subnet to user, of the drivers installed in a user terminal is presented.

Further, a device newly connected to the network is detected; device information from the detected device is acquired; the acquired device information is compared with the terminal information for the user terminals that is previously acquired or inputted; and on the result of the comparison, the user terminals to which the drivers are to be distributed is determined.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the present invention will be described in detail based on the following figures, wherein:

FIG. **1** is a diagram illustrating an example of configuration of the network comprising user PCs to which the present invention is applied;

FIG. **2** is a block diagram illustrating the functional configuration of the user PC **2**;

FIG. **3** is a flow chart illustrating the flow of operations of the user PC **2**;

FIG. **4** is a diagram illustrating an example of configuration of the network **3**;

FIG. **5**A and FIG. **5**B illustrate examples of display screen for the printing dialog;

FIG. **6** is a block diagram illustrating the functional configuration of the user PC **202**;

FIG. **7** is a flow chart illustrating the flow of operations of the user PC **202**;

FIG. **8**A and FIG. **8**B illustrate examples of display screen for the list, respectively;

FIG. **9** is a block diagram illustrating the functional configuration of the user PC of still another embodiment;

FIG. **10**A and FIG. **10**B illustrate an example of display screen for the printing dialog and an example of display screen for the subnet designation, respectively;

FIG. **11** is a flow chart illustrating the flow of operations of the user PC **2** when a subnet is designated on the subnet designation screen **560**;

FIG. **12** is a flow chart illustrating the flow of operations of the user PC **2** in the embodiment 5;

FIG. **13** is a diagram illustrating an example of configuration of the network in the embodiment 6;

FIG. **14** is a block diagram illustrating the functional configuration of the device management apparatus **1003**;

FIG. **15** is a flow chart illustrating the flow of distribution processing of the driver;

FIG. **16** is a drawing illustrating the method of selecting the user by the location information;

FIG. **17** is a drawing illustrating the method of selecting the user by the address;

FIG. **18** is a diagram illustrating an example of configuration of the network in the embodiment 7;

FIG. **19** is a block diagram illustrating the functional configuration of the PC manager **1303**; and

FIG. **20** is a flow chart illustrating the flow of distribution processing of the driver by the manager PC **1303**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiments of the driver management method, the driver management apparatus, and the driver management program according to the present invention will be described with reference to the accompanying drawings.

Embodiment 1

FIG. **1** is a diagram illustrating an example of configuration of the network comprising user PCs to which the present invention is applied. In the configuration as illustrated in FIG. **1**, a plurality of devices **1** (**1**-**1** to **1**-*n*) and a plurality of user PCs **2** (**2**-**1** to **2**-*m*) are connected to one another through a network **3**.

The devices **1** (**1**-**1** to **1**-*n*) are such a device as a printer or a facsimile, which must use a driver for the devices to be operable. The user PCs **2** (**2**-**1** to **2**-*m*) are personal computers for use by respective users. The devices **1** are used by the user PCs **2**. The present invention is applied to the user PCs **2**.

FIG. **2** is a block diagram illustrating the functional configuration of the user PC **2**. As shown in FIG. **2**, the user PC **2** comprises a printing instruction detection section **21**, a driver retracting section **22**, a device detection section **23**, a driver acquisition section **24**, and an install processing section **25**. The printing instruction detection section **21**, the driver retracting section **22**, the device detection section **23**, the driver acquisition section **24**, and the install processing section **25** are each implemented by operating the user PC **2** on the basis of the program.

The printing instruction detection section **21** detects that a printing instruction, such as an instruction for displaying a printing menu, has been issued from an application software (not shown) or the like which the user runs on the PC **2**. When the printing instruction detection section **21** detects a printing instruction, the driver retracting section **22** retracts the drivers for the devices **1** which are connected to the subnets of the network **3** other than the subnet to which the user PC **2** is currently connected. The device detection section **23** detects the devices **1** connected to the subnet of the network **3** to which the user PC **2** is currently connected. The driver acquisition section **24** acquires the driver corresponding to a device **1** for which the corresponding driver is not installed, of the devices **1** which were detected by the device detection section **23**. The driver to be acquired includes information regarding the driver which was retracted by the driver retracting section **22**, in addition to the driver itself. The install processing section **25** carries out installation of the driver which was acquired by the driver acquisition section **24**, and restoration processing of the driver on the basis of the information regarding the retracted driver that was acquired by the driver acquisition section **24**.

Here, the operations of the user PC **2** will be described. FIG. **3** is a flow chart illustrating the flow of operations of the user PC **2**.

When the printing instruction detection section **21** detects a printing instruction by the user (YES at step **101**), the driver retracting section **22** identifies the subnet of the network **3** to which the user PC **2** is currently connected (at step **102**), and identifies the drivers which are installed in the user PC **2** (at step **103**). Then, when a driver to be retracted, i.e., the driver corresponding to a device **1** which is connected to a subnet of the network **3** other than the subnet to which the user PC **2** is connected is installed (YES at step **104**), the driver retracting section **22** retracts the pertinent driver (at step **105**).

Retraction of a driver by the driver retracting section **22** is carried out by moving all the files and pieces of information related to the driver to a desired location (such as in the storage medium in the hard disk) to cause the OS (operating system) in the user PC **2** to recognize that the driver has been uninstalled. Only the minimum number of files and pieces of information that are required for the OS to recognize that the driver is installed, rather than all the files and pieces of information related to the driver, may be moved to a desired location. Alternatively, the retraction of a driver may be carried out by backing up and then unstalling the driver. When the driver retraction is ended, or no drivers to be retracted are installed (NO at step **104**), the device detection section **23** detects the devices **1** connected to the subnet to which the user PC **2** is currently connected (at step **106**).

As a result of this, when a device **1** the corresponding driver for which is not installed in the user PC **2** is detected (YES at step **107**), the driver acquisition section **24** acquires the pertinent driver, and the install processing section **25** installs the pertinent driver (at step **108**). In this case, the driver acquisition section **24** acquires the driver from the previously designated server (not shown) or the like, and in addition to this, when a driver which was retracted by the driver retracting section **22** in the past is to be installed, the driver acquisition section **24** acquires information regarding the retracting destination and the like. And, the install processing section **25** carries out normal install processing for a newly acquired driver, and for a retracted driver, the install processing section **25** carries out restoration processing thereof.

Then, the user PC **2** displays a printing dialog on a display apparatus (not shown) or the like (at step **109**), waiting for a next printing instruction. The results of user instruction on the printing dialog are processed by the OS or the like in the same manner as conventional.

In the flow of operations as shown in FIG. **3**, the detection of a printing instruction is again waited for after the printing dialog being displayed. Alternatively, since the series of operations as illustrated in FIG. **3** is not needed to be repetitively carried out as long as the configuration of the network **3** to which the user PC **2** is connected is not changed, the series of operations may be performed only once after the user PC **2** is turned on, restarted, or connected to the network, for example.

Next, the contents of the indications as given on the printing dialog as a result of the series of operations as shown in FIG. **3** will be described. Here, it is assumed that the network **3** is configured as shown in FIG. **4**.

As shown in FIG. **4**, the network **3** comprises a subnet **3**A, a subnet **3**B, a subnet **3**C, and a subnet **3**D.

The subnet **3**A is a network which network address is "192.168.1.0/24", i.e., a network which usable addresses range from "192.168.1.0" to "192.168.1.255". Likewise, the subnet **3**B has a network address of "192.168.2.0/26" (usable addresses ranging from "192.168.2.0" to "192.168.2.63"), the subnet **3**C has a network address of "192.168.2.64/26" (usable addresses ranging from "192.168.2.64" to "192.168.2.127"), and the subnet **3**D has a network address of "192.168.2.128/25" (usable addresses ranging from "192.168.2.128" to "192.168.2.255").

To the subnet **3**A are connected a device **1**A-**1**, a device **1**A-**2**, a device **1**A-**3**, a device **1**A-**4**, and a device **1**A-S; to the subnet **3**B is connected a device **1**B; to the subnet **3**C are connected a device **1**C-**1**, and a device **1**C-**2**; and to the subnet **3**D are connected a device **1**D-**1**, a device **1**D-**2**, and a device **1**D-**3**.

In such a network configuration, when the user PC **2** is connected to the subnet **3**A, the printing dialog will be that as shown in FIG. **5**A. In the printer selection column **41** in the printing dialog **40** as shown in FIG. **5**A, the device **1**A-**1**, the device **1**A-**2**, the device **1**A-**3**, the device **1**A-**4**, and the device **1**A-**5**, which are connected to the subnet **3**A, are indicated as options.

When the user PC **2** is connected to the subnet **3**C, the printing dialog displayed will be that as shown in FIG. **5**B. In the printer selection column **43** in the printing dialog **42** as shown in FIG. **5**B, the device **1**C-**1** and the device **1**C-**2**, which are connected to the subnet **3**C, are indicated as options.

Although the illustration is omitted in the drawings, when the user PC **2** is connected to the subnet **3**B, the device **1**B is indicated in the printer selection column on the printing dialog, and when the user PC **2** is connected to the subnet **3**D, the device **1**D-**1**, the device **1**D-**2**, and the device **1**D-**3** are indicated in the printer selection column on the printing dialog.

Embodiment 2

Next, an embodiment 2 will be described. In the embodiment 2, a user PC **202**, which is equivalent to the user PC **2** in the embodiment 1, will be described. Since the configuration of the network to which the user PC **202** is connected is similar to the network **3** described in the embodiment 1, the embodiment 2 will be described with reference to FIG. **1** and the like.

FIG. **6** is a block diagram illustrating the functional configuration of the user PC **202**. As shown in FIG. **6**, the user PC **202** comprises a listing instruction detection section **221**, a driver retracting section **222**, a device detection section **223**, a driver acquisition section **224**, and an install processing section **225**. The listing instruction detection section **221**, the driver retracting section **222**, the device detection section **223**, the driver acquisition section **224**, and the install processing section **225** are each implemented by operating the user PC **202** on the basis of the program.

The listing instruction detection section **221** detects that a listing instruction has been issued through the operations of the OS which the user runs on the PC **202**. When the listing instruction detection section **221** detects a listing instruction, the driver retracting section **222** retracts the drivers for the devices **1** which are connected to the subnets of the network **3** other than the subnet to which the user PC **202** is currently connected. The device detection section **223** detects the devices **1** connected to the subnet of the network **3** to which the user PC **202** is currently connected. The driver acquisition section **224** acquires the driver corresponding to a device **1** corresponding driver for which is not installed, of the devices **1** which were detected by the device detection section **223**. The driver to be acquired includes information regarding the driver which was retracted by the driver retracting section **222**, in addition to the driver itself. The install processing section **225** carries out installation of the driver which was acquired by the driver acquisition section **224**, and restoration processing of the driver on the basis of the information regarding the retracted driver that was acquired by the driver acquisition section **224**.

The operations of the user PC **202** will now be described. FIG. **7** is a flow chart illustrating the flow of operations of the user PC **202**.

When the listing instruction detection section **221** detects a printing instruction by the user (YES at step **301**), the driver retracting section **222** identifies the subnet of the network **3** to which the user PC **202** is currently connected (at step **302**), and identifies the drivers which are installed in the user PC **202** (at step **303**). Then, when a driver to be retracted, i.e., the driver corresponding to a device **1** which is connected to a subnet of the network **3** other than the subnet to which the user PC **2** is connected is installed (YES at step **304**), the driver retracting section **222** retracts the pertinent driver (at step **305**).

Retraction of a particular driver by the driver retracting section **222** is carried out by moving all the files and pieces of information related to the driver to a desired location (in the storage medium in the hard disk or the like) to cause the OS (operating system) in the user PC **202** to recognize that the driver has been uninstalled. Only the minimum number of files and pieces of information that are required for the OS to recognize that the driver is installed, rather than all the files and pieces of information related to the driver, may be moved to a desired location, or the uninstall processing itself may be executed.

When the driver retraction is ended, or no drivers to be retracted are installed (NO at step **304**), the device detection section **223** detects the devices **1** connected to the subnet to which the user PC **202** is currently connected (at step **306**).

As a result of this, when a device **1** the corresponding driver for which is not installed in the user PC **202** is detected (YES at step **307**), the driver acquisition section **224** acquires the pertinent driver, and the install processing section **225** installs the pertinent driver (at step **308**). In this case, the driver acquisition section **224** acquires the driver from the previously designated server (not shown) or the like, and in addition to this, when a driver which was retracted by the driver retracting section **222** in the past is to be installed, the driver acquisition section **224** acquires information regarding the retracting destination and the like. Then, the install processing section **225** carries out normal install processing for a newly acquired driver, and the install processing section **225** carries out restoration processing for a retracted driver.

Thereafter, the user PC **202** displays a device (printer) list on a display apparatus (not shown) or the like (at step **309**), waiting for a next listing instruction.

In the flow of operations as shown in FIG. **7**, the detection of a listing instruction is again waited for after the device list being displayed. Alternatively, since the series of operations as illustrated in FIG. **7** is not needed to be repetitively carried out as long as the configuration of the network **3** to which the user PC **202** is connected is not changed, the series of opera-

tions may be performed only once after the user PC **202** is turned on, restarted, or connected to the network, for example.

Next, the contents of the indications as given on the device list as a result of the series of operations as shown in FIG. **3** will be described. Here, it is assumed that the network **3** is configured as shown in FIG. **4** as in the embodiment 1.

In a network configuration as shown in FIG. **4**, when the user PC **202** is connected to a subnet **3**A, the device list displayed will be that as shown in FIG. **8**A. In the list display screen **250** as shown in FIG. **8**A, a device **1**A-**1**, a device **1**A-**2**, a device **1**A-**3**, a device **1**A-**4**, and a device **1**A-**5**, which are connected to the subnet **3**A, are indicated.

When the user PC **202** is connected to a subnet **3**D, the device list displayed will be that as shown in FIG. **8**B. In the list display screen **251** as shown in FIG. **8**B, a device **1**D-**1**, a device **1**D-**2**, and a device **1**D-**3**, which are connected to the subnet **3**D, are indicated.

Although the illustration is omitted, when the user PC **202** is connected to a subnet **3**B, a device **1**B is indicated in the list display screen, and when the user PC **202** is connected to a subnet **3**C, the device **1**C-**1** and a device **1**C-**2** are indicated in the list display screen.

Embodiment 3

Next, an embodiment 3 will be described. In the embodiment 3, a user PC **402**, which is equivalent to the user PC **2** in the embodiment 1, will be described. Since the configuration of the network to which the user PC **402** is connected is similar to the network **3** described in the embodiment 1, the embodiment 3 will be described with reference to FIG. **1** and the like.

FIG. **9** is a block diagram illustrating the functional configuration of the user PC **402**. As shown in FIG. **9**, the user PC **402** comprises an instruction detection section **421**, a driver retracting section **422**, a device detection section **423**, a driver acquisition section **424**, and an install processing section **425**. The instruction detection section **421**, the driver retracting section **422**, the device detection section **423**, the driver acquisition section **424**, and the install processing section **425** are each implemented by operating the user PC **402** on the basis of the program.

The instruction detection section **421** detects that a printing instruction, such as an instruction for displaying a printing menu, has been issued from application software (not shown) or the like which the user runs on the PC **402**, and that a listing instruction has been issued through the operations of the OS which the user runs on the PC **402**. When the instruction detection section **421** detects a listing instruction, the driver retracting section **422** retracts the drivers for the devices **1** which are connected to the subnets of the network **3** other than the subnet to which the user PC **402** is currently connected. The device detection section **423** detects the devices **1** connected to the subnet of the network **3** to which the user PC **402** is currently connected. The driver acquisition section **424** acquires the driver corresponding to a device **1** the corresponding driver for which is not installed, of the devices **1** which were detected by the device detection section **423**. The driver to be acquired includes information regarding the driver which was retracted by the driver retracting section **422**, in addition to the driver itself. The install processing section **425** carries out installation of the driver which was acquired by the driver acquisition section **424**, and restoration processing of the driver on the basis of the information regarding the retracted driver that was acquired by the driver acquisition section **424**.

This user PC **402** provides a configuration in which the instruction detection section **421** detects a printing instruction and a listing instruction, in other words, a configuration in which the user PC **2** in the embodiment 1 and the user PC **202** in the embodiment 2 are mixed with each other. As a result both the operations as illustrated in FIG. **3** and that as illustrated in FIG. **7** are performed. Thus, the description of the operations of the user PC **402** is omitted.

Embodiment 4

The embodiment 4 allows utilization of the devices connected to the subnets other than the subnet to which the user PC is currently connected, and the embodiment 4 can be combined with each of the above-mentioned embodiments 1 to 3. Here, the embodiment 4 will be described for the configuration of the embodiment 1.

In the configuration of the embodiment 4, the user PC **2** displays a printing dialog as shown in FIG. **10**A. In a printer selection column **541** in the printing dialog **540** as shown in FIG. **10**A, "other subnet" is added to device **1**C-**1** and the like as an option.

When the user selects this "other subnet", the display screen (not shown) in the user PC **2** displays a subnet designation screen **560** as shown in FIG. **10**B. When the user designates a desired subnet on the subnet designation screen **560**, the printing dialog is again displayed, and in the printer selection column in the printing dialog, the devices which are connected to the designated subnet are displayed as options.

Now, the operations of the user PC **2** when a subnet is designated on the subnet designation screen **560** will be described. FIG. **11** is a flow chart illustrating the flow of operations of the user PC **2** when a subnet is designated on the subnet designation screen **560**.

When a subnet is designated on the subnet designation screen **560**, the device detection section **23** detects the devices **1** which are connected to the designated subnet (at step **601**).

As a result, when a device **1** the corresponding driver for which is not installed in the user PC **2** is detected (YES at step **602**), the driver acquisition section **24** acquires the pertinent driver, and the install processing section **25** installs the pertinent driver (at step **603**). In this case, the driver acquisition section **24** acquires the driver from the previously designated server (not shown) or the like, and in addition to this, when a driver which was retracted by the driver retracting section **22** in the past is to be installed, the driver acquisition section **24** acquires information regarding the retracting destination and the like. Then, the install processing section **25** carries out normal install processing for a newly acquired driver, and the install processing section **25** carries out restoration processing for a retracted driver.

Thereafter, the user PC **2** displays a printing dialog on a display apparatus (not shown) or the like (at step **604**), ending the operations.

The processing as illustrated in FIG. **11** only adds the drivers for the devices which are connected to the subnet designated by the user. The processing may be adapted such that the drivers of the devices which were already detected (the devices in the subnet to which the user PC **2** is currently connected) are retracted.

Embodiment 5

The embodiment 5 provides an example in which, when the drivers corresponding to the devices in the subnet to which a user PC is currently connected are to be installed in the user PC, if one or more object drivers have been retracted, a new

driver is not installed. The embodiment 5 can be used in combination with each of the embodiments 1 to 4. Here, however, the embodiment 5 will be described on the basis of the configuration of the embodiment 1. FIG. **12** is a flow chart illustrating the flow of operations of the user PC **2** in the embodiment 5.

When the printing instruction detection section **21** detects a printing instruction by the user (YES at step **701**), the driver retracting section **22** identifies the subnet of the network **3** to which the user PC **2** is currently connected (at step **702**), and identifies the drivers which are installed in the user PC **2** (at step **703**). Then, when a driver to be retracted, i.e., the driver corresponding to a device **1** which is connected to a subnet of the network **3** other than the subnet to which the user PC **2** is connected is installed (YES at step **704**), the driver retracting section **22** retracts the pertinent driver (at step **705**).

When the driver retraction is ended, or no drivers to be retracted are installed (NO at step **704**), the driver retracting section **22** identifies the retracted drivers. If a driver which is to be restored is found (YES at step **706**) as a result of the identification, the driver acquisition section **24** acquires information regarding the retracting destination and the like for the pertinent driver, and the install processing section **25** carries out restoration processing of the retracted driver (at step **707**). Then, the user PC **2** displays a printing dialog on a display apparatus (not shown) or the like (at step **708**), waiting for a next printing instruction.

On the other hand, if no drivers which are to be restored are found (NO at step **706**) as a result of the identification of the retracted drivers by the driver retracting section **22**, the device detection section **23** detects the devices **1** connected to the subnet to which the user PC **2** is currently connected (at step **709**). If a device **1** the corresponding driver for which is not installed in the user PC **2** is detected, the driver acquisition section **24** acquires the pertinent driver, and the install processing section **25** installs the pertinent driver (at step **710**). Then, the user PC **2** displays a printing dialog on a display apparatus (not shown) or the like (at step **708**), waiting for a next printing instruction.

In the flow of operations as shown in FIG. **12**, the detection of a printing instruction is again waited for after the printing dialog being displayed, however, since the series of operations as illustrated in FIG. **12** is not needed to be repetitively carried out as long as the configuration of the network **3** to which the user PC **2** is connected is not changed, the series of operations may be performed only once after the user PC **2** is turned on, restarted, or connected to the network, for example.

Embodiment 6

FIG. **13** is a diagram illustrating an example of configuration of the network in the embodiment 6. In the configuration as illustrated in FIG. **13**, a device **1001**, a device **1002**, a device management apparatus **1003**, a user information management apparatus **1004**, and a plurality of user PCs **1005** (**1005-1** to **1005-***n*) are connected to one another through a network **1006**.

The device **1001** and the device **1002** are a device, such as a printer, respectively, and which must use a driver for the devices to be operable. Here, it is assumed that the device **1001** is a newly installed one, and the device **1002** is an already installed one.

The device management apparatus **1003** is an apparatus to which the present invention is applied, and which supplies a driver for the user PC **1005**, for example.

The user information management apparatus **1004** is an apparatus, such as a directory server, which manages user information. The user information managed by this user information management apparatus **1004** is capable of being acquired by using the LDAP (lightweight directory access protocol) or the like. The user information management apparatus **1004** is not an apparatus which is always necessary.

User PCs **1005-1** to **1005-***n* are a PC which is used by the user of the device **1001** or the device **1002**, respectively.

Now, the device management apparatus **1003** will be described. FIG. **14** is a block diagram illustrating the functional configuration of the device management apparatus **1003**.

Referring to FIG. **14**, the device management apparatus **1003** comprises a device detection section **1031**, a device information management section **1032**, a user information acquisition section **1033**, a user information storage section **1034**, a user selection section **1035**, and a driver distribution section **1036**. The device detection section **1031**, the device information management section **1032**, the user information acquisition section **1033**, the user information storage section **1034**, the user selection section **1035**, and the driver distribution section **1036** are each implemented by operating the device management apparatus **1003**, which is a server computer, on the basis of the program.

The device detection section **1031** detects the devices connected to the network **1006**, and when a newly installed device (device **1001**, for example) is detected, the device information for the pertinent device is acquired, and the device information acquired is passed to the device information management section **1032**. The device detection section **1031** acquires the driver corresponding to the detected device **1001** through the device management apparatus **1003** (a portion not shown) or a server (not shown) connected to the network **1006**, a server (not shown) connected to another network which is connectable through the network **1006**, or the like, and passes it to the device information management section **1032**. The device information management section **1032** manages the device information and the driver which were acquired by the device detection section **1031**.

The device information includes the address of the pertinent device (the network address, such as the IP address), the information regarding the type of the device and the installation location, and the like, including at least the address. Detection of a device by the device detection section **1031** is carried out by means of transmitting from the pertinent device or by making periodical poling. Whether the detected device is a newly installed device or not is determined by examining whether or not the address of the detected device is that which is already managed by the device information management section **1032**.

The user information acquisition section **1033** acquires the user information regarding the users who utilize the network **1006**. When the user information management apparatus **1004** is connected to the network **1006**, the user information is acquired from the user information management apparatus **1004**. When the user information management apparatus **1004** is not connected, the user information which was inputted by the manager or the like is acquired. When the device is already installed in the network **1006**, and the user information registered in the pertinent device (device **1002**, for example) is capable of being acquired, that user information may be acquired. The acquired user information is stored in the user information storage section **1034**. The user information storage section **1034** stores the user information acquired by the user information acquisition section **1033**, managing it.

The user selection section **1035** compares the device information managed by the device information management section **1032** with the user information stored in the user information storage section **1034**. From the result of comparison, the users to whom the driver corresponding to the device **1001** which was newly detected is to be distributed are selected. The users to whom the driver is to be distributed are selected on the basis of the installation locations for the user terminals **1005** used by the users, and the device **1001**, and the like. The specific selection method will be described later.

The driver distribution section **1036** distributes the driver to the user terminals **1005** which are used by the users selected by the user selection section **1035**. In this case, the pertinent driver is distributed in the format which incorporates the device information and the like necessary for install, for example, as a file in the execute form (installer). The distribution method used may be that as stated in Japanese patent application publication No. 2000-215128, or E-mail may be used for distribution to the selected users.

Next, the flow of distribution processing of the driver by the device management apparatus **1003** will be described. FIG. **15** is a flow chart illustrating the flow of distribution processing of the driver.

The device detection section **1031** detects a device connected to the network **1006** (YES at step **1101**). When it is determined that the device detected is a newly installed device (YES at step **1102**), the device detection section **1031** acquires the device information from the pertinent device, and stores the device information acquired in the device information management section **1032** (at step **1103**).

Then, the device detection section **1031** acquires the driver corresponding to the detected device through a portion of the device management apparatus **1003** or a server connected to the network **1006**, a server connected to another network which is connectable through the network **1006**, or the like, and stores the acquired driver in the device information management section **1032** (at step **1104**).

The user selection section **1035** compares the device information stored in the device information management section **1032** with the user information stored in the user information storage section **1034**, and selects the users to whom the driver is to be distributed (at step **1105**). The user information stored in the user information storage section **1034** is that which is previously acquired by the user information acquisition section **1033**. If the user information is not acquired, it may be acquired by the user information acquisition section **1033** at this point of time.

When the users to whom the driver is to be distributed are selected by the user selection section **1035**, the user selection section **1035** distributes the driver to the selected users (at step **1106**), the distribution processing of the driver corresponding to the device which has been newly detected being ended, and the device management apparatus waits for another device being detected.

Next, the selection of the users by the user selection section **1035** will be described. The user selection section **1035** selects the users by comparing the device information with the user information. Here, examples of making comparison by using each of the location information indicating the installation location for the device, the address of the device, and the type of the device will be described.

Firstly, the case in which the location information for the device is used to select the users will be described. To utilize the location information, it is required that, when a device is installed, the manager register the location information indicating the installation location for the device in the pertinent device as the device information. In addition, it is necessary to incorporate the location information indicating the installation location for each user terminal **1005** in the user information.

As the location information, "room A", "room B", and "room C" are registered for the device **1010**, the device **1011**, and the device **1012** as shown in FIG. **16**, respectively. In this case, the user terminal installed in the "room A" is selected as an object to which the driver for the device **1010** is to be distributed, and the user terminal installed in the "room B" is selected as an object to which the driver for the device **1011** is to be distributed. Likewise, the user terminal installed in the "room C" is selected as an object to which the driver for the device **1012** is to be distributed.

When, with the device **1010** and the device **1011** being not installed, the device **1010** is to be newly installed such that the device **1010** is capable of being used by the user terminal installed in either the "room A" or the "room B", both the "room A" and the "room B" may be registered as the location information to be registered in the device **1010**.

Secondly, the case in which the address of the device is used for selecting the users will be described. To utilize the address, it is required that, when a device is installed, the manager set the address in the device, however, address setting is an essential processing for a device connected to the network, and is not a processing provided specifically for the user selection according to the present invention.

Here, the case in which a device is connected to a network using the TCP/IP will be used as an example for description. As shown in FIG. **17**, it is assumed that a device **1013**, a device **1014**, and a device **1015** are connected to a network **1060** having a network address of "192.168.1.0" and a subnet mask value of "255.255.255.192", a network **1061** having a network address of "192.168.1.64" and a subnet mask value of "255.255.255.192", and a network **1062** having a network address of "192.168.2.0" and a subnet mask value of "255.255.255.0", respectively.

In such a case, even if the network **1060**, the network **1061**, and the network **1062** are capable of communicating with one another, they are separate networks (subnets), respectively. With the network **1060**, the address between "192.168.1.0" and "192.168.1.63" is used, thus also for the device **1013**, any one of the addresses is set.

Therefore, by selecting the user terminals to which the address between "192.168.1.0" and "192.168.1.63" is provided, as the users to which the driver for the device **1013** is to be distributed, the driver is capable of being distributed only to the user terminals which are connected to the same network.

Thirdly, the case in which the type of the device is used for selecting the users will be described. To utilize the type of the device, each user is required to previously register the type of the device which is to be used, as the user information. Then, the driver is distributed to the users with which the type of the device installed is identical to the type of the device included in the user information. Selection of the users by the type of the device may be combined with the user selection using the above-mentioned location information or address such that the users selected by the location information or address are narrowed down by the type of the device.

By incorporating information other than described here in each of the device information and the user information, the mode of selection of the users by the user selection section **1035** may be adapted to a desired one.

Embodiment 7

FIG. **18** is a diagram illustrating an example of configuration of the network in the embodiment 7. In the example of

configuration as illustrated in FIG. **18**, a device **1301**, a device **1302**, a manager PC **1303**, a user information management apparatus **1304**, and a plurality of user PCs **1305** (**1305-1** to **1305**-n) are connected to one another through a network **1306**.

The device **1301** and the device **1302** are such a device as a printer, and which must use a driver for the devices to be operable. The manager PC **1303** is an apparatus to which the present invention is applied, and which supplies a driver for the user PC **1305**, for example.

The user information management apparatus **1304** is an apparatus, such as a directory server, which manages user information. The user information managed by this user information management apparatus **1304** is capable of being acquired by using the LDAP (lightweight directory access protocol) or the like. The user information management apparatus **1304** is not an apparatus which is always necessary.

User PCs **1305-1** to **1305-*n*** are a PC which is used by the user of the device **1301** or the device **1302**, respectively.

Now, the PC manager **1303** will be described. FIG. **19** is a block diagram illustrating the functional configuration of the PC manager **1303**.

Referring to FIG. **19**, the PC manager **1303** comprises an input receiving section **1330**, a device detection section **1331**, a device information management section **1332**, a user information acquisition section **1333**, a user information storage section **1334**, a user selection section **1335**, and a driver distribution section **1336**. The input receiving section **1330**, the device detection section **1331**, the device information management section **1332**, the user information acquisition section **1333**, the user information storage section **1334**, the user selection section **1335**, and the driver distribution section **1336** are each implemented by operating the manager PC **1303** on the basis of the program.

The input receiving section **1330** receives an input of instruction or information by the manager, and notifies each of the device detection section **1331**, the device information management section **1332**, the user information acquisition section **1333**, the user information storage section **1334**, and the user selection section **1335** of the received instruction or information.

The device detection section **1331**, the device information management section **1332**, the user information acquisition section **1333**, the user information storage section **1334**, the user selection section **1335**, and the driver distribution section **1336** correspond to the device detection section **1031**, the device information management section **1032**, the user information acquisition section **1033**, the user information storage section **1034**, the user selection section **1035**, and the driver distribution section **1036** in the embodiment 6, respectively, and thus the description is omitted here.

The manager PC **1303** carries out basically the same processing as that carried out by the device management apparatus **1003** in the embodiment 6. However, the manager PC **1303** is different from the device management apparatus **1003** in that the manager is capable of instructing the timing of detection of a device, selection of the users, and the like.

Here, the flow of distribution processing of the driver by the manager PC **1303** will be described. When the manager PC **1303** is used to automatically distribute the driver, the manager PC **1303** carries out the same distribution processing as that carried out by the manager PC **1001**, and thus the description is omitted here. FIG. **20** is a flow chart illustrating the flow of distribution processing of the driver by the manager PC **1303**.

When detection is instructed by the manager (YES at step **1401**), the device detection section **1331** detects a device connected to the network **1306** (YES at step **1402**), and when it is determined that the device detected is a newly installed device (YES at step **1403**), the device detection section **1331** acquires the device information from the pertinent device, and stores the device information acquired in the device information management section **1332** (at step **1404**).

Then, the device detection section **1331** acquires the driver corresponding to the detected device through a portion of the manager PC **1303** or a server connected to the network **1306**, a server connected to another network which is connectable through the network **1306**, or the like, and stores the acquired driver in the device information management section **1332** (at step **1405**).

When distribution of the diver is instructed by the manager (YES at step **1406**), the user selection section **1035** compares the device information stored in the device information management section **1332** with the user information stored in the user information storage section **1334**, and selects the users to whom the driver is to be distributed (at step **1407**). At this time, the user selection section **1335** may indicate the selected users as the distribution objects to the manager, and cause the manager to add or delete a user. Then, the driver distribution section **1336** distributes the driver to the selected users (at step **1408**), the distribution processing of the driver corresponding to the device which has been newly detected being ended.

The method of selecting the users by the user selection section **1335** is the same as the method of selecting the users by the user selection section **1035** in the embodiment 6, and thus the description is omitted here.

What is claimed is:

1. A driver management system, comprising:

a user terminal that is connected to a first subnet among subnets which form a network; and

a plurality of devices, each being connected to one of the subnets and requiring a driver for operation from the user terminal,

wherein the user terminal comprises:

an instruction detection section that detects a printing instruction;

a driver retracting section that, when a corresponding driver to a device connected to a second subnet to which the user terminal is not currently connected has been installed on the detection of the printing instruction by the instruction detection section, retracts the corresponding driver so that the user terminal cannot recognize the corresponding driver, wherein the second subnet includes more than one device;

a device detection section that detects devices connected to the first subnet to which the user terminal is currently connected after the corresponding driver is retracted by the driver retracting section;

a driver acquisition section that, when a device for which a driver corresponding thereto is not installed is present among the devices detected by the device detection section, acquires a driver corresponding to the device; and

an install processing section that installs the driver acquired by the driver acquisition section in the user terminal, wherein the driver acquisition section, when a driver corresponding to any of the devices detected by the device detection section has been retracted by the driver retracting section, acquires the driver by restoring the retracted driver.

2. The driver management system according to claim **1**, wherein the driver retracting section comprises:

a first identifying section that identifies the first subnet to which the user terminal is currently connected; and

a second identifying section that identifies drivers that are already installed in the user terminal, and

when a driver corresponding to a device connected to the second subnet other than the first subnet identified by the first identifying section is present among the drivers identified by the second identifying section, retracts the driver.

3. A user terminal that is connected to a first subnet of a network which configures the network and that operates a plurality of devices which require a driver for operation of the devices through the first subnet, comprising:

an instruction detection section that detects a printing instruction;

a driver retracting section that, when a corresponding driver to a device connected to a second subnet to which the user terminal is not currently connected has been installed on the detection of the printing instruction by the instruction detection section, retracts the corresponding driver so that the user terminal cannot recognize the corresponding driver, wherein the second subnet includes more than one device;

a device detection section that detects devices connected to the first subnet to which the user terminal is currently connected after the corresponding driver is retracted by the driver retracting section;

a driver acquisition section that, when a device for which a corresponding driver is not installed is present among the devices detected by the device detection section, acquires a driver corresponding to the device; and

an install processing section that installs the driver acquired by the driver acquisition section to the user terminal, wherein the driver acquisition section, when a driver corresponding to any of the devices detected by the device detection section has been retracted by the driver retracting section, acquires the driver by restoring the retracted driver.

4. A driver management method of a system comprising a user terminal that is connected to a first subnet among subnets which configure a network, and a plurality of devices, each being connected to one of the subnets and requiring a driver for operation from the user terminal, the method comprising:

detecting a printing instruction;

retracting, on the detection of the printing instruction when a corresponding driver to a device connected to a second subnet to which the user terminal is not currently connected has been installed in the user terminal, the corresponding driver so that the user cannot recognize the corresponding driver, wherein the second subnet includes more than one device;

detecting devices connected to the first subnet to which the user terminal is currently connected after the corresponding driver is retracted by the driver retracting section;

when a device for which a corresponding driver is not installed is present among the detected devices, acquiring a driver corresponding to the device;

installing the acquired driver in the user terminal which detected the printing instruction; and

when a driver corresponding to any of the detected devices has been retracted, acquiring the driver by restoring the retracted driver.

5. A non-transitory computer readable medium storing a program causing a computer to execute a process for controlling a user terminal which is connected to a subnet that is part of a network and uses a plurality of devices which each require a driver in use of the devices through the subnet, the process comprising:

detecting a printing instruction;

identifying a first subnet to which the user terminal is currently connected on the detection of the printing instruction;

identifying already installed drivers;

retracting, when a driver of a device connected to a second subnet other than the identified first subnet is present in the identified drivers, the driver so that the user cannot recognize the driver, wherein the second subnet includes more than one device,

detecting devices connected to the first subnet to which the user terminal is currently connected;

acquiring, when a device for which a corresponding driver is not installed is present among the detected devices, a driver corresponding to the device;

installing the acquired driver; and

when a driver corresponding to any of the detected devices has been retracted, acquiring the driver by restoring the retracted driver.

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